Labour Canada
Travail Canada

OCCUPATIONAL SAFETY AND HEALTH

Canada

85-0050/

INDUSTRIAL ACCIDENT COSTS
(1969-1979)

Occupational Safety and Health Branch

Labour Canada

March, 1983

Published by Authority of the
Minister of Labour
Government of Canada

Également disponible en français sous le titre:
Coût des accidents du travail (1969 à 1979)

Additional copies of this publication may be obtained from:

Publications Distribution Centre
Labour Canada
Ottawa, Ontario
K1A 0J2
(819) 994-0543

© Minister of Supply and Services Canada 1984

Cat. No. L 31-49/1984E

ISBN 0-662-13089-8

Labour Canada
Catalogue Number L46-1318/83E

Printed in Canada

TABLE OF CONTENTS

		Page
Summary		v
Chapter 1:	ACCIDENT COSTS - WORK INJURY COSTS IN CANADIAN INDUSTRIES UNDER ALL JURISDICTIONS, 1969-1979	1
1.1	An Overview of the Cost Factors and Problems	1
1.2	Workdays Lost and Injuries	9
1.3	Accident Prevention Costs, McGraw-Hill Survey of Investments in Safety and Health	22
1.4	Capital Spending on Accident Prevention in Canadian Industries	29
1.5	Estimated Costs of Compliance with Occupational Safety and Health Legislation	31
1.6	Workers' Compensation Boards' Accident Prevention Expenditures in Canada 1978-1979	36
1.7	Occupational Safety and Health Joint Committees, Costs and Funding	38
1.8	Quebec Case	40
1.9	Cost Effective Safety Activities	42
Chapter 2:	INDUSTRIES UNDER FEDERAL JURISDICTION; PART IV, CANADA LABOUR CODE	46
2.1	Work Injury Costs Under Federal Jurisdiction	46
2.2	Workdays Lost, Employers Under Federal Jurisdiction	49
Chapter 3:	FEDERAL PUBLIC SERVICE DEPARTMENTS, AND CROWN CORPORATIONS AND AGENCIES	50

APPENDICES

		Page
1.	Workers' Compensation Board Premium Rates Over $10 per $100 by Selected Industries	62
2.	Accident Costs	64
3.	Accident Prevention Expenditures	65
4.	Federal Government Departments	67
5.	Federal Crown Corporations and Agencies	69
6.	Employer's Annual Accident Experience Report, Part IV, Canada Labour Code	70
7.	Report of An Employment Injury Coding Form	72
REFERENCES		74

TABLES

1.	Work Injury Direct Costs and Forecasts in Canada, 1969-1984	3
2.	Trends in Work Injury Compensation Benefit Outlays in Canada and U.S.A.	5
3.	Direct Costs and Indirect Costs Estimated Using Given Levels of Multipliers, 1969-1984	7
4.	Total Work Injury Costs Estimated Given Levels of Multipliers, 1969-1984	8
5.	Workdays Lost Due to Work Injuries and Illnesses vs. Work Stoppages	12
6.	Workdays Lost in Million Days, 1969-1980	13
7.	Workdays Lost by Province, 1978	14
8.	Extent of Injuries by Province in 1978	15
9.	Distribution of Workdays Lost Due to Temporary Disability in 1978	16
10.	Workdays Lost, British Columbia, 1969-1979	18
11.	Workdays Lost, Saskatchewan, 1969-1979	19

		Page
12.	Workdays Lost, Alberta, 1969-1979	20
13.	Workdays Lost/Disability Injury, Manitoba, 1969-1979	21
14.	Work Injury Costs, and Investment in Employee Safety and Health in U.S.A., 1972-1979	23
15.	Investment in Employee Safety and Health, 1972-1979, U.S.A.	25
16.	Plans for Investment in Employee Safety and Health in U.S.A.	26
17.	Employee Safety and Health Investment as a Percentage of Capital Spending, U.S.A., 1972-1979.	27
18.	Employee Safety and Health Investment as a Percentage of Capital Spending, U.S.A., 1980-1984.	28
19.	Capital Expenditures and Estimated Investments For Employees' Safety and Health, and Work Injury Direct Costs in Canada, 1971-1981	30
20.	Estimated Total Cost of Compliance with OSHA Standards, NAM Survey	34
21.	Estimated Total Cost of Compliance with OSHA Standards, Industrial Research Unit Aerospace Questionnaire, 1976-1977	35
22.	Direct Compensation Costs vs WCB Accident Prevention Expenditures	37
23.	Industrial Safety Committees as of March 1981 (Canada-wide)	39
24.	Safety Committee Size	40
25.	Estimated Operating Costs of Joint Committees by Type of Coverage, Quebec Case (1978 Dollars)	41
26.	Decreasing Rank Order of the Cost-Effectiveness of Selected Variables Upon the Cost of Work Injuries Per Employee for Texas Chemical, Paper, and Wood Product Firms	44
27.	Hourly Wage, Safety Program Cost, Work Injury Cost in Three Industries	45
28.	Estimated Work Injury Direct Costs by Province, Federal Jurisdiction Industries, 1973-1979	47
29.	Estimated Total Cost, Federal Jurisdiction Industries, 1973-1979	48

		Page
30.	Injury Experience and Days Lost, Federal Jurisdiction Industries, 1973-1979	49
31.	Comparison of Days Lost and Compensation Costs Accumulated at End of Fiscal Year and Two Years Later, 1970-1976 Federal Public Service	52
32.	Comparison of Days Lost and Compensation Costs Accumulated at End of Fiscal Year and Two Years Later, Employers not Under Treasury Board	53
33.	Compensation Expenditures By Fiscal Year (Federal Government)	54
34.	Work Injury Experience, Federal Government Departments and Crown Corporations and Agencies, 1977-1978 and 1978-1979	56
35.	Work Injury Cost, Federal Government Departments and Crown Corporations and Agencies, 1977-1978 and 1978-1979	57
36.	Days and Workdays Lost by Workers Under Government Employees Compensation Act, 1971-1972 to 1979-1980	59
37.	Estimated Fiscal Yearly Direct and Indirect Work Injury Costs for Federal Government Departments, Crown Corporations and Agencies under Government Employees Compensation Act, 1970-1971 to 1979-1980	60

CHARTS

1.	Payroll and Compensation Costs, Canada	4
2.	Trend in Work Injury Compensation Outlays, Canada and U.S.A.	6
3.	Workdays Lost vs Work Stoppages, Canada, 1970-1979	11
4.	Capital Spending for Occupational Safety and Health as Percentages of Total Capital Expenditures	24
5.	Estimated Cost per Worker of Compliance with OSHA Standards, by Company Size (1976-1977)	33
6.	Average Workdays Lost, 1971-1979, Federal Public Service Departments, Federal Crown Corporations and Agencies	58

SUMMARY

The purpose of this paper is to review the cost factors related to accidents which lead to work injuries and, to some extent, accident prevention costs. The cost factors also include workdays lost due to work injuries. The study is organized in three parts: Canada (all jurisdictions); Federal Jurisdiction; Federal Public Service and Crown Corporations.

In Chapter 1, a general overview of the cost factors under all jurisdictions is made. Workdays lost due to injuries are compared with days lost due to absenteeism and work stoppages. Canadian work injury compensation expenditures are reviewed along with those of the United States. Also, Canadian expenditures for accident prevention programs are given as a proportion of total capital investment for various industrial sectors.

Also included in the accident prevention investment section is a discussion of the impact of a statutory requirement for employers to establish joint labor-management safety and health committees, because of its relevance to the currently proposed amendment to Part IV of the Canada Labour Code.

At the company level, a case study by H.C. Rinefort is cited. Rinefort claims that the most cost-effective safety activities are: safety rules, off-the-job safety, safety training, safety orientation and safety meetings, and medical facilities, supplies and staff.

Chapter 2 reviews work injury costs in industries under federal jurisdiction, and Chapter 3 deals with the cost factors in the federal government.

Work injuries and industrial investment in safety and health cost Canadians about $7.2 billion in 1980. For the industries, there is no other way of recovering these costs than by passing on the cost to the consumers. This adds to the price of everything that one buys. To make the problem worse, these costs are continuously increasing.

Chapter 1

ACCIDENT COSTS - WORK INJURY COSTS IN CANADIAN INDUSTRIES UNDER ALL JURISDICTIONS, 1969-1979

1.1 An Overview of the Cost Factors and Problems

The purpose of this chapter is to provide some background information about the measurement of various cost factors pertaining to work injuries in business organizations in Canada. Work injury direct and indirect costs, including forecast costs, will be presented first. Workdays lost due to injuries and stoppages, and a comparison of these two types of days lost, will follow. Finally, some data about the measurement of accident prevention costs (reviewing U.S., Quebec and Saskatchewan cases) will be examined to estimate a range of Canadian capital investment for employee safety and health.

Over the study period, overall work injuries in Canada increased 35 per cent as compared to an increase of 29 per cent in employment.[1] In 1969, the total compensation costs for lost wages and medical expenses was $274.5 million. The $1 101 million paid out in 1979 represents a more than fourfold increase (Table 1). This increase is attributable to a number of factors, such as updated compensation legislation, inflation coupled with higher wages, and increased medical costs. In terms of 1971 constant dollars, this increase is roughly twofold.

Over the study period, 54 per cent of the total payment was for lost earnings, 28 per cent for pension payments and 18 per cent for medical expenditures.

Medical costs and pension payments during the period increased threefold. Compensation for lost earnings increased fourfold, a similar increase to that in overall work injury costs.

The relative magnitude of the direct cost of accidents may be portrayed approximately by compensation premium rates (see Appendix 1). The premium rates are based on the payroll assessment by industries according to accident hazard. Each provincial Worker's Compensation Board fixes the assessment rate appropriate for each class or group. Therefore, the rates directly reflect the cost of accidents. Certain other factors must also be considered. In the high-hazard industrial classifications, the rates may be as high as 23.65 per cent of the total assessed payroll. As a result, direct accident cost by itself could be a measure of efficient management in accident prevention. But the direct cost is overshadowed by the vastly greater cost referred to as

---

[1] Estimates of Employees by Provincial Industry, 1961-1976, Statistics Canada Catalogue No. 72-516 and Catalogue No. 72-008 (May 1979), plus Estimates of Paid Workers in Agriculture, Labour Force Survey. Excludes Northwest Territories and Yukon.

"hidden" or "indirect" cost. Some of the indirect costs are listed in Appendix 2, which shows that the boards' direct costs do not accurately reflect the expenditures borne by the employer, the employee and society. Heinrich estimated that the indirect cost is roughly four times the direct cost. In other words, the direct cost constitutes only one-fifth of the total accident cost. Heinrich claims that "although it is not intended that this ratio holds true for every industry or every individual plan, it has already been tested sufficiently to provide approximate confirmation". Some other researchers (Wallach, 1962; Crosby, 1962; Smart and Sanders, 1976) have suggested that the total cost of occupational injury is between two and six times the private costs incurred and reported by the insurance carrier. Findlay (Cochrane, 1979) has estimated the range to be between four and ten times. Consequently, Manga et al. (1981) suggest that a factor of between two and ten be used to calculate the indirect cost.

The indirect cost may involve plant shutdown, hiring and retraining personnel, investigations, inquests, lawyers' fees, inspections and equipment repairs or replacements, social welfare service costs, and other social costs that could not be explicitly expressed in monetary terms. Indirect costs to industry for work injuries involving complex technological equipment could be as much as ten to 15 dollars for every dollar in workers' compensation payments. Another very important cost element which is not generally included in the accident costs is related to property damage. Heinrich estimated that in a group of 330 accidents, 300 accidents resulted in no injuries, 29 in minor injuries, and one resulted in a major or disabling injury. Property damages, however, have not yet been well documented.

Another fact that we should note is that, in the United States, the insurance premiums paid by a business owner are about twice[2] the amount of money paid out by the compensation board in claim settlement whereas, in Canada, the claim disbursement is roughly 77.6 per cent of the assessment. This difference of cost is not included in either the "direct" or "indirect" cost.

Overall, as shown notice in Chart 2 the total compensation payments both in Canada and U.S. continue on an upward trend. Two sets of forecasted cost figures are presented in Table 1.

---

[2]"Workshop: Finding the True Accident Costs", Proceedings of the President's Conference on Occupational Safety, June 1954, U.S. Department of Labor, pp.231-238.

Table 1

Work Injury Direct Costs and Forecasts in Canada[1]
1969-1984

Year	Total Payroll[2] (000,000)	Total Cost (% of Payroll) (,000)		Compensation (% of Total Cost) (,000)		Medical (% of Total Cost) (,000)		Pension (% of Total Cost (,000)	
	$	$	%	$	%	$	%	$	%
1969	40 663	274 481	(0.68)	120 443	(43.9)	68 159	(24.8)	85 868	(31.3)
1970	44 088	307 711	(0.70)	134 192	(43.6)	76 805	(25.0)	96 714	(31.4)
1971	48 458	318 992	(0.66)	148 389	(46.5)	79 612	(25.0)	90 990	(28.5)
1972	53 923	367 683	(0.68)	177 845	(48.4)	86 115	(23.4)	103 723	(28.2)
1973	62 426	426 162	(0.68)	209 565	(49.2)	96 939	(22.7)	119 660	(28.1)
1974	74 509	521 396	(0.70)	264 007	(50.6)	109 070	(20.9)	151 321	(29.0)
1975	86 727	657 291	(0.76)	337 241	(51.3)	137 275	(20.9)	182 775	(28.0)
1976	100 059	774 518	(0.77)	411 416	(53.1)	162 769	(21.0)	200 333	(25.9)
1977	110 076	857 301	(0.79)	453 538	(53.0)	173 544	(20.2)	230 220	(26.9)
1978	119 764	995 474	(0.83)	495 929	(50.0)	198 906	(20.2)	300 639	(30.2)
1979	134 023	1 101 423	(0.82)	574 544	(52.2)	211 477	(19.2)	315 403	(28.6)
1980	*149 142	1 342 750	(0.90)	702 995	(52.4)	248 862	(18.5)	*390 894	(29.1)
1981	*158 759	*1 270 072		*660 437		*257 825		*351 809	
1982	*171 094	*1 368 752		*711 751		*277 856		*379 144	
1983	*182 884	*1 463 072		*760 797		*297 004		*405 271	
1984	*194 061	*1 552 488		*792 938		*309 550		*430 039	

[1]Excludes Northwest Territories and Yukon.

[2]Estimates of Labour Income, Statistics Canada, Catalogue No. 72-005.

*Forecasts based on the forecasted total costs, assuming 52.0%, 20.3%, and 27.7% of the total cost for Compensation, Medical and Pension, respectively.

CHART 1

PAYROLL AND COMPENSATION COSTS
CANADA*

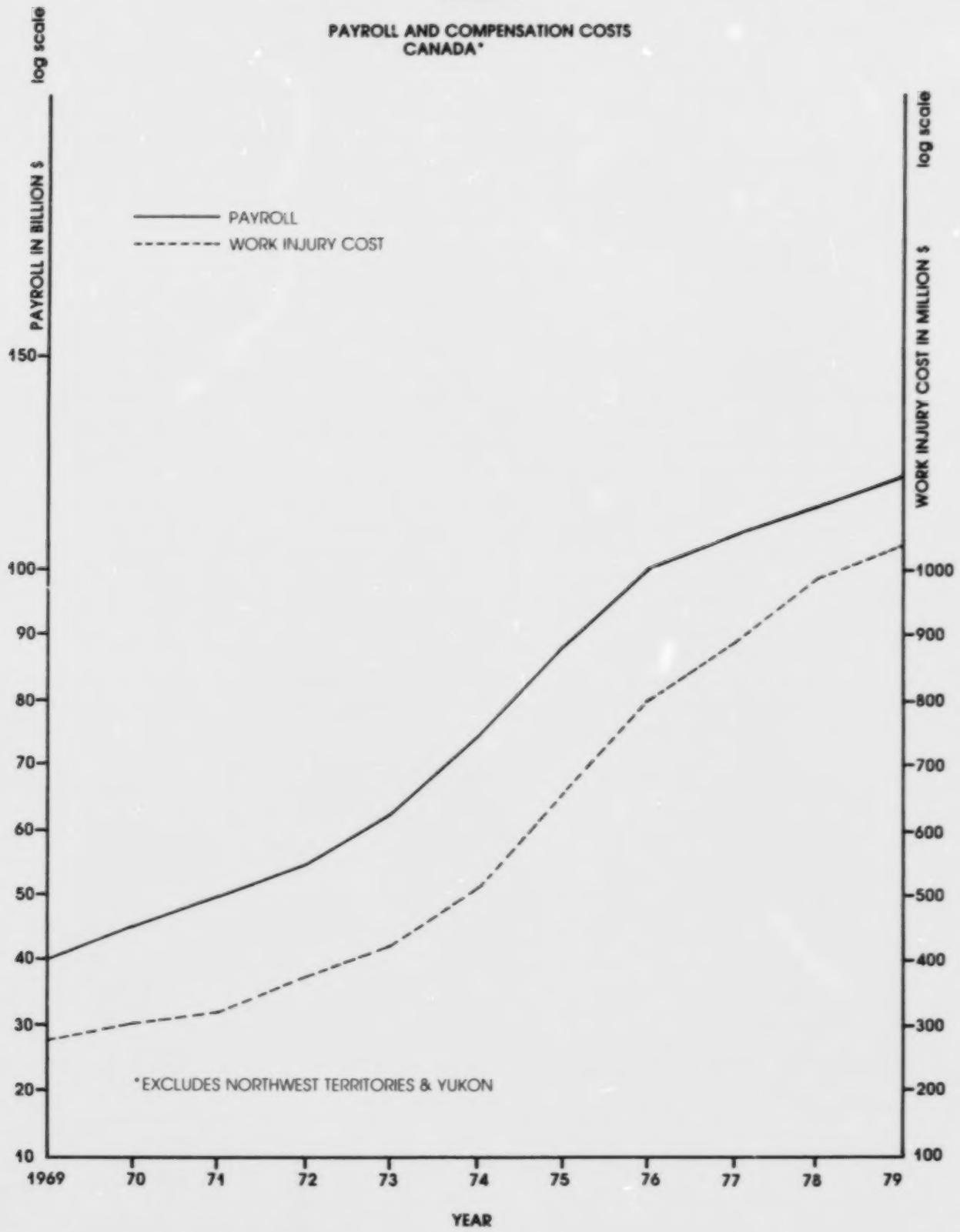

Table 2

Trend in Work Injury Compensation Benefit Outlays
in Canada and U.S.A.

Year	Canada[1] (,000) $	Growth %	U.S.A.[2] (,000) $	Growth %
1970	307 711			
		3.67		
1971	318 992			
		15.26		
1972	367 683		5 830 000	
		15.90		16.12
1973	426 162		6 770 000	
		22.35		16.40
1974	521 396		7 880 000	
		26.06		13.83
1975	657 291		8 970 000	
		17.83		23.30
1976	774 518		11 060 000	
		10.69		26.85
1977	857 301		14 030 000	
		16.12		
1978	995 474			
		10.36		
1979	1 098 653			

[1]Cost of claims compensated in the given years and the claims originating in prior years. Excludes Northwest Territories and Yukon.

[2]Represents premiums written by private carriers and state trends; self-insurers' benefits and administrative costs; and benefits paid and administrative costs of federal system for government employees.

Source: U.S. Social Security Administration
(November, 1979, Occupational Hazards)

CHART 2

TRENDS IN WORK INJURY COMPENSATION OUTLAYS, CANADA AND U.S.A. (,000 dollars)

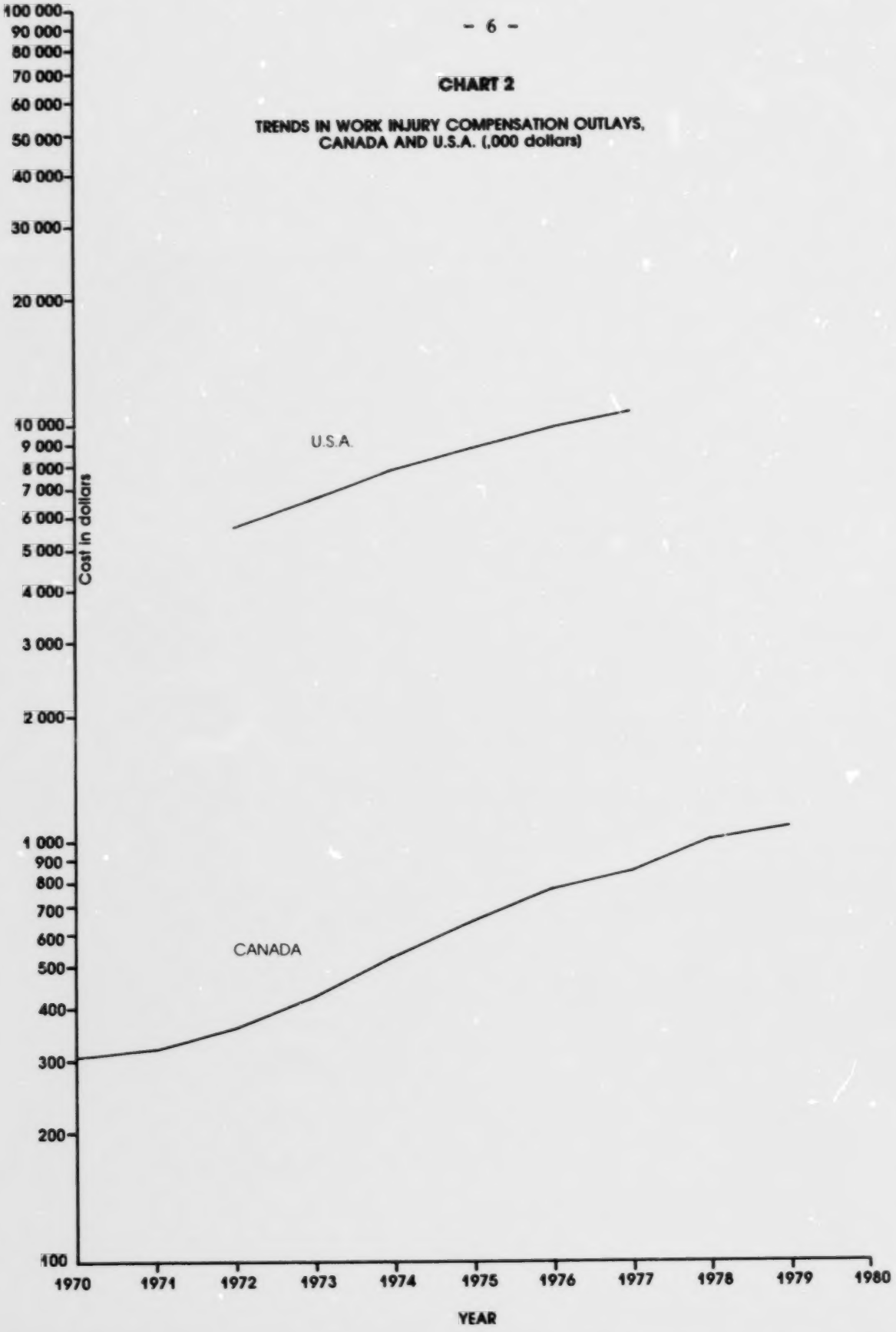

Table 3

Direct Costs and Indirect Costs Estimated Using Given Levels of Multipliers, 1969-1984

Year	Direct Costs	Estimated Indirect Costs ($000s)							
		2 Times Direct Cost	3 Times Direct Cost	4 Times Direct Cost	5 Times Direct Cost	6 Times Direct Cost	7 Times Direct Cost	8 Times Direct Cost	9 Times Direct Cost	10 Times Direct Cost
1970	307 711	615 422	923 133	1 230 844	1 538 555	1 846 266	2 153 977	2 461 688	2 769 399	3 077 110
1971	318 992	637 984	956 976	1 275 968	1 594 960	1 913 952	2 232 944	2 551 936	2 870 928	3 189 920
1972	367 683	735 366	1 103 049	1 470 732	1 838 415	2 206 098	2 573 781	2 941 464	3 309 147	3 676 830
1973	426 162	852 324	1 278 486	1 704 648	2 130 810	2 556 972	2 983 134	3 409 296	3 835 458	4 261 620
1974	521 396	1 042 792	1 564 188	2 085 584	2 606 980	3 128 376	3 649 772	4 171 168	4 692 564	5 213 960
1975	657 291	1 314 582	1 971 873	2 629 164	3 286 455	3 943 746	4 601 037	5 258 328	5 915 619	6 572 910
1976	774 518	1 549 036	2 323 554	3 098 072	3 872 590	4 647 108	5 421 626	6 196 144	6 970 662	7 745 180
1977	857 301	1 714 602	2 571 903	3 429 204	4 286 505	1 543 806	6 001 107	6 858 408	7 715 709	8 573 010
1978	995 474	1 990 948	2 986 422	3 981 896	4 977 370	5 972 844	6 968 318	7 963 792	8 959 266	9 954 740
1979	1 098 653	2 197 306	3 295 959	4 394 612	5 493 265	6 591 918	7 690 571	8 789 224	9 887 877	10 986 530
1980	1 167 872	2 335 744	3 503 616	4 671 488	5 839 360	7 007 232	8 175 104	9 342 976	10 610 848	11 678 720
1981	1 270 072	2 540 144	3 810 216	5 080 288	6 350 360	7 620 432	8 890 504	10 160 576	11 430 648	12 700 720
1982	1 368 752	2 737 504	5 106 256	5 475 008	6 843 760	8 212 512	9 581 264	10 950 016	12 318 768	13 687 520
1983	1 463 072	2 926 144	4 389 216	5 852 288	7 315 360	8 778 432	10 241 504	11 704 576	13 167 648	14 630 720
1984	1 552 488	3 104 976	4 657 464	6 209 952	7 762 440	9 314 928	10 867 416	12 419 904	13 972 392	15 524 880

Table 4

Total Work Injury Costs Estimated Using Given Levels of Multipliers, 1969-1984

Year	Estimated Total Costs Based on Multipliers ($000s)								
	2	3	4	5	6	7	8	9	10
1970	923 133	1 230 844	1 538 555	1 846 266	2 153 977	2 461 688	2 769 399	3 077 110	3 384 821
1971	956 976	1 275 968	1 594 960	1 913 952	2 232 944	2 551 936	2 870 928	3 189 920	3 508 912
1972	1 103 049	1 470 732	1 838 415	2 206 098	2 573 781	2 941 464	3 309 147	3 676 830	4 044 513
1973	1 278 486	1 704 648	2 130 810	2 556 972	2 983 134	3 409 296	3 835 458	4 261 620	4 687 782
1974	1 564 188	2 085 584	2 606 980	3 128 376	3 649 772	4 171 168	4 692 564	5 213 960	5 735 356
1975	1 971 873	2 629 164	3 286 455	3 943 746	4 601 037	5 258 328	5 915 619	6 572 910	7 230 201
1976	2 323 554	3 098 072	3 872 590	4 647 108	5 421 626	6 196 144	6 970 662	7 745 180	8 519 698
1977	2 571 903	3 429 204	4 286 505	5 143 806	6 001 107	6 858 408	7 715 709	8 573 010	9 430 311
1978	2 986 422	3 981 896	4 977 370	5 972 844	6 968 318	7 963 792	8 959 266	9 954 740	10 950 214
1979	3 295 959	4 394 612	5 493 265	6 591 918	7 690 571	8 789 224	9 887 877	10 986 530	12 085 183
1980	3 503 616	4 671 488	5 839 360	7 007 232	8 175 104	9 342 976	10 510 848	11 678 720	12 846 592
1981	3 810 216	5 080 288	6 350 360	7 620 432	8 890 504	10 160 576	11 430 648	12 700 720	13 970 792
1982	4 106 256	5 475 008	6 843 760	8 212 512	9 581 264	10 950 016	12 318 768	13 687 520	15 056 272
1983	4 389 216	5 852 288	7 315 360	8 778 432	10 241 504	11 704 576	13 167 648	14 630 720	16 093 792
1984	4 657 464	6 209 952	7 762 440	9 314 928	10 867 416	12 419 904	13 972 392	15 524 880	17 077 368

Total Cost = Direct + Indirect Cost

1.2 Workdays Lost and Injuries

During the period 1969-1980, 133.9 million days were lost due to various types of disabling injuries at Canadian workplaces. This figure is nearly twice the 73.2 million days lost for strikes and lockouts during the same period. The lost time injuries are only those claims settled by Workers' Compensation Boards (WCB), and do not include occupational illnesses and other work injuries not covered by the boards. This estimate is only a fraction of the total days lost when all work injuries and occupational illnesses are included. As quoted by P. Manga et al. in their report to the Economic Council of Canada, Rabinovitch (1979) estimated that each year Canada loses 70 million working days because workers suffer disabling or fatal injuries or die of cancer caused by exposure to toxic substances in mine, mill or factory. This estimate includes non-compensated cancer deaths. That is nearly ten times as many days as are lost by workers going on strikes or being locked out by their employers. Translated into full-time workers, Canada loses 35 000 full-time productive workers due to work injuries and occupational illnesses each year. The total workdays lost (70 million) is roughly 56 per cent of the total of 125 million days lost due to sickness, accident, and casual absenteeism in Canadian industries each year.

On the average 54 per cent of the work injuries settled by WCBs involved no loss of work time except on the day of injury. The remaining 46 per cent resulted in the loss of productive services of 432 000 full-time workers during the 10 years (1970-1979). As shown in Chart 3, the workdays lost figures indicate an increasing trend, in contrast to that of work stoppages.

The average of workdays lost due to work injuries and occupational illnesses varies from province to province, from one industrial sector to another, and over time. For example, Saskatchewan and British Columbia reported in their annual WCB reports that in 1978 the forestry industries suffered the highest rate of workdays lost -- 23.8 per cent in Saskatchewan and 23.5 per cent in British Columbia -- while the lowest rates were in light and power — 0.5 per cent in Saskatchewan and 0.6 per cent in British Columbia. Quebec reported in the same year that on the average 52.6 compensated days were attributed to the hunting and fishing industry, 23.7 days to the forestry industry, and the lowest — 9.4 days -- to public administration.

Saskatchewan reported that, of 1 980 685 days lost in 1979, 66.2 per cent resulted from injuries in 1979, 24.3 per cent from injuries in 1978, and 9.5 per cent from injuries in 1977 or earlier. These figures represent the actual number of days lost by injured workers (wage-loss cases), and do not include days charged for permanent disability and fatality cases. In B.C., there were 1 704 126 days lost from work during 1977 due to injuries, 23.6 per cent of them resulting from injuries in 1976 and 10.3 per cent from injuries in 1975 or earlier. These figures again represent the actual number of days lost by injured workers, and do not include days charged for permanent disabilities and fatalities. As Table 9 shows, over 95 per cent of the settled temporary disability cases had an average time loss of 22 days.

This estimate was based on the reports on the distribution of workday-loss cases terminated in 1978 for three provinces -- Manitoba, New Brunswick and Prince Edward Island.

On the average, 180.7 days in Saskatchewan, 341.3 days in Manitoba, and 77.7 days in Quebec were charged to permanent disability cases. In general, a statistical benchmark for the charging of days to a permanent disability case is to take a certain percentage of the 6 000 days which is charged to a fatality case. The percentage, of course, depends on the seriousness of injuries.

We used an average of 25 days to estimate total workdays lost due to work injuries and occupational illness cases settled by WCBs. This average was derived from time-lost experience with disabling injuries in provinces where workdays lost were recorded.

CHART 3

WORKDAYS LOST VS. WORK STOPPAGES, CANADA
1970-1979

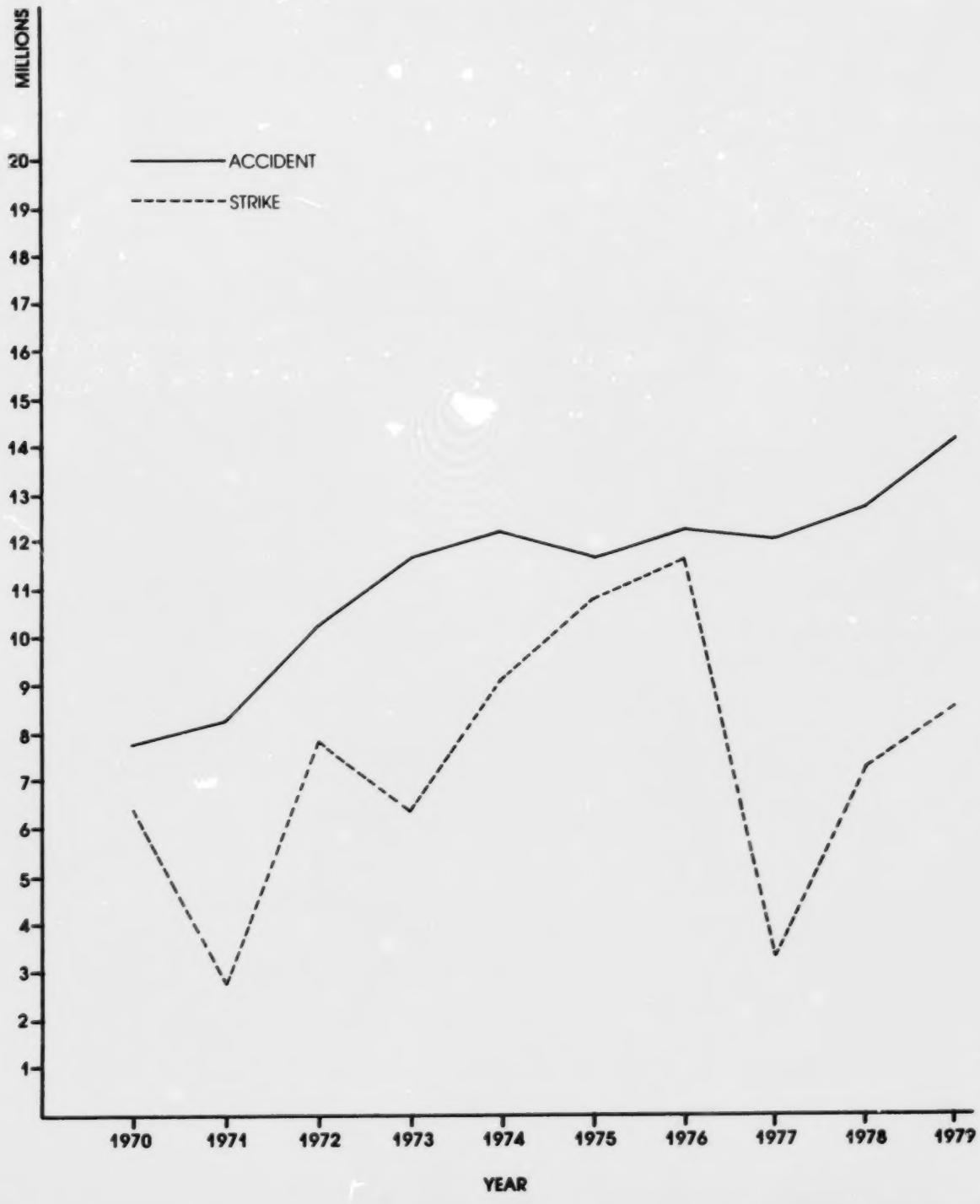

Table 5

Workdays Lost Due to Work Injuries and Illnesses vs. Work Stoppages*

Year	Workdays Lost due to Work Injuries (1) (in millions)	Days Lost due to Work Stoppages (2) (in millions)	Ratio (1) ÷ (2)
1970	7.84	6.5	1.21
1971	8.12	2.9	2.80
1972	10.17	7.8	1.30
1973	11.44	5.8	2.00
1974	12.31	9.3	1.32
1975	11.44	10.9	1.05
1976	12.31	11.6	1.06
1977	11.86	3.3	3.60
1978	12.76	7.4	1.72
1979	14.06	7.8	1.80
Total	112.31	73.3	
Average	11.23	7.33	1.53

* Includes lockouts.

Table 6

Workdays Lost in Million Days,
1969-1980

Year	Total Days Compensated	Total Waiting Period	Total Including Waiting Period
1969	7.25	0.30	7.55
1970	7.54	0.30	7.84
1971	7.81	0.31	8.12
1972	9.77	0.40	10.17
1973	11.00	0.44	11.44
1974	11.81	0.50	12.31
1975	11.00	0.44	11.44
1976	11.81	0.50	12.31
1977	11.36	0.50	11.86
1978	12.26	0.50	12.76
1979	13.52	0.54	14.06
1980P	13.40	0.60	14.00
Total	128.53	5.33	133.86
Average	10.71	0.44	11.16

* Including fatal disabling injuries as reported by each Workmen's Compensation Board.

P Preliminary figures.

Table 7

Workdays Lost by Province, 1978

Province	Number of Disabling Injuries	Number of Workdays Lost	Workdays Lost per Disabling Injury
Newfoundland	6 149	140 000	23
Prince Edward Island	1 819	38 000	21
Nova Scotia	12 093	276 000	22
New Brunswick	9 654	151 000	16
Quebec	159 529	3 154 000	20
Ontario	150 385	4 900 000	33
Manitoba	17 815	255 000	14
Saskatchewan	15 485	302 000	19
Alberta	44 506	938 000	21
British Columbia	66 233	1 704 000	26
Total Canada (excluding Yukon and Northwest Territories)	483 668	11 858 000	25

Table 8

Extent of Injuries by Province in 1978

Province	Medical Aid (1)	Temporary Disability(%) (2)	Permanent Disability(%) (3)	Total Non-fatal(%) (2) + (3)	Fatal Cases (%) (4)	Total Disabling Injuries (2) + (3) + (4)	Total (1) + (2) + (3) + (4)
NFLD.	6 502	5 828(94.8)	303(4.9)	6 131(48.4)	18(0.30)	6 149	12 651
P.E.I.	1 502	1 517(98.3)	20(1.3)	1 537(50.5)	6(0.40)	1 543	3 045
N.S.	21 000	11 684(95.4)	659(5.3)	12 343(37.0)	50(0.40)	12 393	33 393
N.B.	12 731	8 443(95.4)	379(4.3)	8 822(40.9)	26(0.30)	8 848	21 579
QUE.	147 360	149 418(93.8)	9 722(6.1)	159 140(51.9)	219(0.14)	159 359	306 719
ONT.	235 560	142 764(94.9)	7 435(4.9)	150 199(38.9)	186(0.12)	150 385	385 945
MAN.	16 166	17 201(97.7)	379(2.2)	17 580(52.0)	34(0.19)	17 614	33 780
SASK.	18 757	14 722(95.4)	714(9.6)	15 436(45.1)	47(0.30)	15 483	34 240
ALTA.	64 908	54 936(96.1)	240(3.9)	57 176(46.8)	138(0.24)	57 314	122 222
B.C.	64 112	63 458(96.0)	2 623(4.0)	66 081(50.7)	152(0.23)	66 233	130 345
Total	588 598	469 971(94.9)	24 474(4.9)	494 445(45.6)	876(0.18)	495 321	1 083 919

Note: Disability percentage figures (2), (3) and (4) are in relation to Total Disabling Injuries ((2) + (3) + (4)), whereas Non-fatal percentage figure ((2) + (3) is compared with the total ((1) + (2) + (3) + (4)).

Table 9
Distribution of Workdays Lost Due to Temporary Disability in 1978

Weeks		No. of Cases (%)		Total Weeks (%)	
Less than 10	Man.	16 663	(96.88)	26 039.5	(72.68)
	N.B.	8 152	(86.91)	19 329.0	(41.58)
	P.E.I.	1 425	(93.94)	2 715.5	(52.82)
	Sub-Total	26 240	(93.40)	48 084.0	(55.00)
10 to less than 20	Man.	379	(2.20)	5 274.5	(14.72)
	N.B.	725	(7.73)	10 080.5	(21.68)
	P.E.I.	57	(3.76)	869.5	(16.91)
	Sub-Total	1 161	(4.14)	16 224.5	(18.56)
20 to less than 30	Man.	110	(0.64)	2 585.0	(7.22)
	N.B.	249	(2.65)	5 971.5	(12.84)
	P.E.I.	15	(0.99)	378.5	(7.36)
	Sub-Total	374	(1.33)	8 935.0	(10.22)
30 to less than 40	Man.	28	(0.16)	961.0	(2.68)
	N.B.	108	(1.15)	3 711.0	(7.98)
	P.E.I.	4	(0.26)	138.0	(2.68)
	Sub-Total	140	(0.50)	4 810.0	(5.50)
40 to less than 50	Man.	15	(0.09)	667.5	(1.86)
	N.B.	68	(0.72)	3 039.0	(6.54)
	P.E.I.	3	(0.20)	131.5	(2.56)
	Sub-Total	86	(0.31)	3 838.0	(4.39)
50 to less than 60	Man.	4	(0.02)	221.0	(0.62)
	N.B.	66	(0.70)	3 442.0	(7.40)
	P.E.I.	2	(0.13)	109.0	(2.12)
	Sub-Total	72	(0.26)	3 772.0	(4.31)
60 to less than 70	Man.	0	(0.00)	0.0	(0.00)
	N.B.	7	(0.07)	488.5	(1.05)
	P.E.I.	5	(0.33)	329.5	(6.41)
	Sub-Total	12	(0.04)	818.0	(0.91)
70 to less than 80	Man.	1	(0.00)	79.5	(0.22)
	N.B.	2	(0.02)	153.0	(0.33)
	P.E.I.	4	(0.26)	297.0	(5.78)
	Sub-Total	7	(0.02)	529.5	(0.60)

Table 9 (continued)

Weeks		No. of Cases (%)		Total Weeks (%)	
80 to less than 90	Man.	0	(0.00)	0.0	(0.00)
	N.B.	2	(0.02)	176.0	(0.38)
	P.E.I.	2	(0.13)	173.0	(3.36)
	Sub-Total	4	(0.01)	349.0	(0.40)
90 to less than 100	Man.	0	(0.00)	0.0	(0.00)
	N.B.	1	(0.01)	98.5	(0.21)
	P.E.I.	0	(0.00)	0.0	(0.00)
	Sub-Total	1	(0.01)	98.5	(0.11)
Total		28 097 Cases		87 458.5 Weeks	
Average: 3.11 (weeks/case) or 22 (days/case)					

Table 10

Workdays Lost, British Columbia,
1969-1979

Year	Disabling Injuries	Workdays Lost	Workdays Lost/ Disabling Injury
1969	31 840	950 266	29.8
1970	30 386	838 296	27.6
1971	31 968	961 905	30.1
1972	40 881	1 019 460	24.9
1973	50 712	1 257 980	24.8
1974	56 124	1 465 680	26.1
1975	54 454	1 399 650	25.7
1976	56 260	1 331 240	23.7
1977	60 443	1 440 100	23.8
1978	66 233	1 607 730	24.3
1979	77 327	1 736 180	22.5

Table 11

Workdays Lost, Saskatchewan,
1969-1979

Year	Disabling Injuries	Workdays Lost	Workdays Lost/ Disabling Injury
1969	11 569	186 317	16.1
1970	10 737	N/A	
1971	10 273	169 407	16.5
1972	12 155	203 903	16.8
1973	11 517	188 892	16.4
1974	13 361	225 954	16.9
1975	14 190	236 010	16.6
1976	15 565	243 075	15.6
1977	16 250	271 492	16.7
1978	15 485	286 912	18.5
1979	16 993	307 543	18.1

Table 12

Workdays Lost, Alberta,
1969-1979

Year	Disabling Injuries	Workdays Lost	Workdays Lost/ Disabling Injury
1969	25 740	443 772	17.2
1970	27 527	470 733	17.1
1971	27 784	497 255	17.9
1972	27 882	540 686	19.4
1973	29 597	707 465	23.9
1974	32 683	735 665	22.5
1975	34 329	761 944	22.2
1976	41 488	849 800	20.5
1977	43 604	923 695	21.2
1978	44 506	938 401	21.1
1979	50 282	1 038 889	20.7

Table 13

Workdays Lost/Disabling Injury, Manitoba, 1969-1979

Year	Disabling Injuries	Workdays Lost	Workdays Lost/ Disabling Injury
1969			17
1970			16
1971			17
1972			16
1973			14.8
1974	N/A	N/A	13.8
1975			14.2
1976			14.4
1977			15.0
1978			14.3
1979			13.4

1.3 Accident Prevention Costs, McGraw-Hill Survey of Investments in Safety and Health

Since 1972 McGraw-Hill has been undertaking economy-wide annual surveys of capital investment in employee safety and health in U.S.A. Investment by industries is presented in tables 14 and 15; the share as a percentage of total capital spending by industries is shown in tables 16 and 17. In 1972, the total spending amounted to 3.28 billion dollars as compared to 4.13 billion dollars in 1980; that is, a 26 per cent increase. But this apparent increase of safety and health spending may be illusory, due to the effects of inflation. Chart 4 suggests that the real spending may even be down. Since 1981, the spending has declined even more sharply. It appears that as business held back on overall capital spending in the face of the recent economic recession, the industries cut back most sharply in costs essential to maintaining operations, including perhaps safety and health. In fact, the survey projection for 1982-1984 suggests that real safety and health spending in general will decline in the coming years. Furthermore, the Reagan Administration's "deregulation" policy in occupational safety and health matters might also have had an effect on the decline. Based on the recent three-year period of 1979-1981, employers invested, on average, 12 cents for accident prevention for every dollar expended for work injury . Even this proportion of investment may be grossly overestimated, since the costs of property damage and other socioeconomic costs were not included in the work injury cost.

From Table 16, it is evident that the manufacturing industries producing both durable and non-durable goods decided to decrease their capital expenditures for workers' safety and health by 5.2 per cent and 8.2 per cent respectively, from 1981 to 1982. In contrast, over the same time period, non-manufacturing industries have a 13.5 per cent increase in planned investment in this area, resulting in a fractional overall increase of merely 1.5% for business as a whole.

Ashford notes that "the magnitude of the capital expenditures in this area, though significant in absolute terms, is relatively small as a proportion of total investment. Moreover, investment in employee health and safety is far less than the investment in general environmental protection in many industries."

The proportion of the capital investment allotted to workers' safety and health was 2.7 per cent in 1972; recently it has been reduced to 1.4 per cent in 1980, 1.5 per cent in 1981, and only 1.3 per cent in 1982. On the other hand, the outlays for work injury compensation in both United States and Canada are constantly increasing as depicted in Chart 2.

Table 14

Work Injury Costs, and Investment in Employee Safety and Health in U.S.A., 1972-1979

Year	Work Injury** Costs (1)	Accident Prevention* Costs (2)	Ratio (1)/(2)
	$ billion	$ billion	
1972	11.5	3.28	3.51
1973	14.0	3.62	3.87
1974	15.3	4.40	3.48
1975	16.0	3.84	4.17
1976	17.8	3.42	5.20
1977	20.7	4.29	4.83
1978	23.0	6.65	3.46
1979	27.3	4.32	6.32
1980	30.2	4.13	7.31
1981	32.5	5.06***	6.42

*Source: "9th Annual McGraw-Hill Survey of Investment in Employee Safety and Health," June, 1981, Economics Department, McGraw-Hill Publishing Company, N.Y.

**Accident Facts, National Safety Council. These cost figures include only wage loss, medical expense, health insurance administration cost, and fire loss. Not included are the costs of property damage other than fire loss, and the like.

***Planned

CHART 4

CAPITAL SPENDING FOR OCCUPATIONAL SAFETY AND HEALTH AS PERCENTAGES OF TOTAL CAPITAL EXPENDITURES

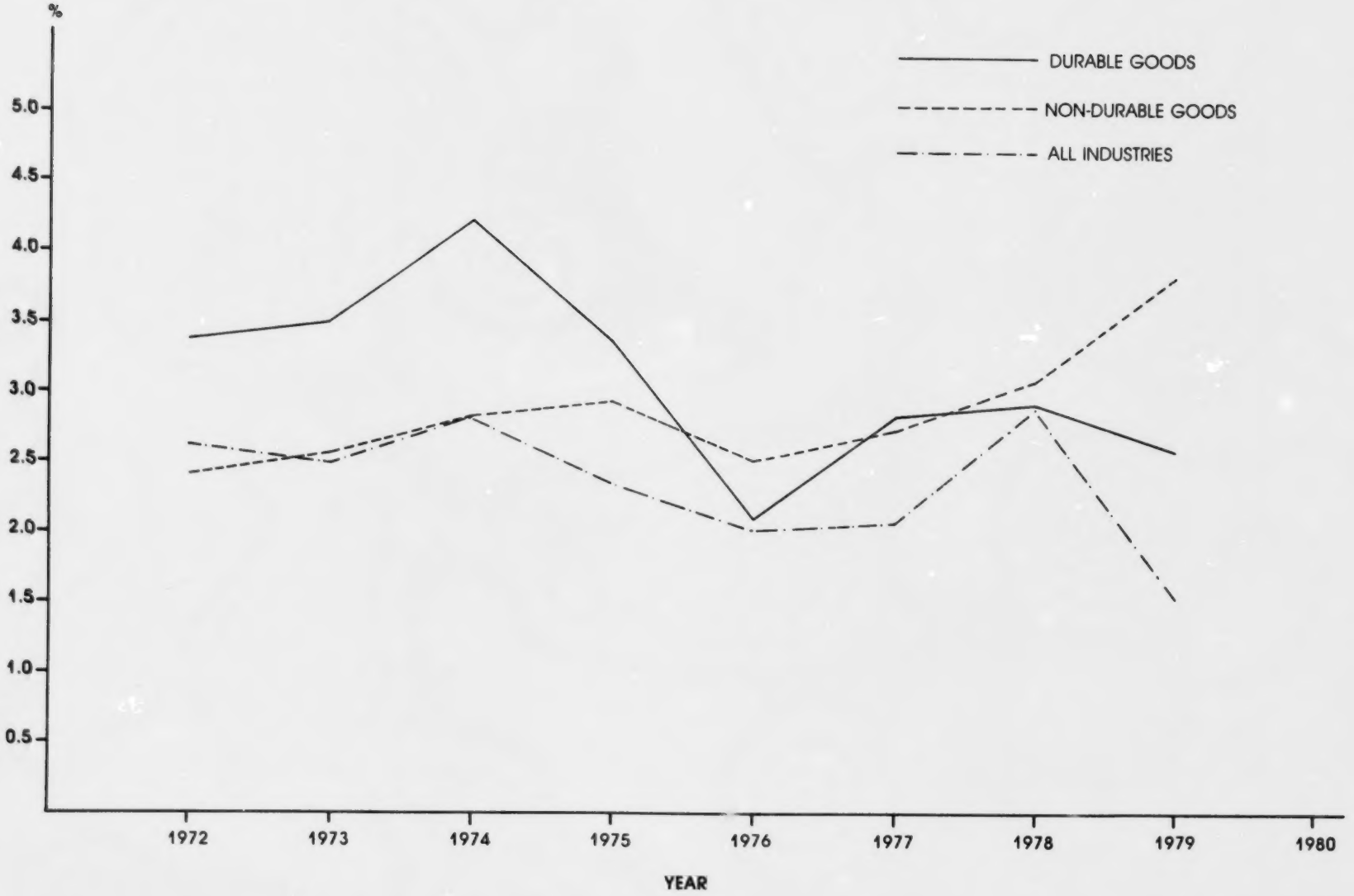

Table 15

Investment in Employee Safety and Health, U.S.A.
1972-1979
($ millions)

Industry	1972	1973	1974	1975	1976	1977	1978	1979
	$	$	$	$	$	$	$	$
Iron and Steel	132	86	68	57	27	33	43	56
Non-ferrous Metals	30	55	94	143	63	34	34	57
Electrical Machinery	68	74	77	82	106	107	125	153
Machinery	97	155	167	114	105	158	231	200
Autos, Trucks and Parts	144	169	370	80	40	198	159	349
Aerospace	22	35	66	59	74	70	84	158
Other Transportation Equipment	18	15	15	26	19	23	122	N/A
Fabricated Metals	19	33	45	30	31	115	84	98
Instruments	15	35	92	107	29	30	48	56
Stone, Clay and Glass	34	74	80	98	62	99	96	35
Other Durables	48	56	69	92	47	74	159	N/A
TOTAL DURABLES	627	787	1 143	888	603	941	1 185	1 162
Chemicals	71	85	136	244	284	252	296	356
Paper and Pulp	53	62	49	66	65	43	88	67
Rubber	14	34	132	66	31	30	36	48
Petroleum	62	168	197	240	118	228	446	146
Food and Beverages	92	98	97	109	192	154	203	126
Textiles	84	59	63	51	42	101	92	116
Other Non-durables	42	20	38	44	51	131	110	186
TOTAL NON-DURABLES	418	526	712	820	783	939	1 271	1 045
ALL MANUFACTURING	1 045	1 313	1 855	1 708	1 386	1 880	2 456	2 207
Mining	101	103	222	171	134	305	13	114
Railroads	29	32	54	58	184	30	97	81
Airlines	48	36	25	24	52	17	253	60
Other Transportation	137	133	61	117	83	189	111	52
Communications	305	739	536	458	541	565	704	418
Electric Utilities	190	135	216	167	150	200	443	249
Gas Utilities	24	33	48	30	47	87	27	19
Trade and Services	1 400	1 092	1 386	1 109	838	1 018	2 541	951
ALL NON-MANUFACTURING	2 234	2 303	2 548	2 134	2 029	2 411	4 189	1 944
ALL BUSINESS	3 279	3 616	4 403	3 842	3 415	4 291	6 645	4 151

Source: Same as Table 14.

Table 16

Plans for Investment in Employee Safety and Health in U.S.A.
($ millions)

Industry	Actual 1980	Planned 1981	Change 1980-1981	Planned 1982-1984 Average Annual Expenditure	% Change 1981 to 1982-1984
	$	$	%	$	%
Iron and Steel	34.5	45.2	31.0	46.9	3.8
Non-ferrous Metals	62.2	73.0	17.4	71.1	-2.6
Electrical Machinery	160.4	180.3	12.4	122.8	-31.9
Machinery	378.0	336.0	-11.1	536.1	59.6
Autos, Trucks and Parts	92.3	204.5	121.6	208.6	2.0
Aerospace	28.2	32.3	14.5	26.9	-16.7
Fabricated Metals	35.9	46.9	30.6	36.5	-22.2
Instruments	26.4	51.6	95.5	23.7	-54.1
Stone, Clay and Glass	135.6	174.6	28.8	89.5	-48.7
Other Durables	137.2	200.4	46.1	112.9	-43.7
TOTAL DURABLES	1 090.7	1 344.8	23.3	1 275.0	-5.2
Chemicals	449.3	581.2	29.4	729.5	25.5
Paper and Pulp	102.3	109.7	7.2	76.9	-29.9
Rubber	144.8	254.7	75.9	94.0	-63.1
Petroleum	165.5	200.5	21.1	105.1	-47.6
Food and Beverages	151.2	198.5	31.3	196.5	-1.0
Textiles	127.7	177.5	39.0	136.2	-23.3
Other Non-durables	106.5	120.5	13.1	169.9	41.0
TOTAL NON-DURABLES	1 247.3	1 642.0	31.6	1 508.1	-8.2
ALL MANUFACTURING	2 338.0	2 987.4	27.8	2 783.1	-6.8
Mining	362.3	390.7	7.8	420.8	7.7
Railroads	88.4	124.2	40.5	182.8	47.2
Airlines	52.7	76.0	44.2	76.6	0.8
Electric Utilities	466.7	521.4	11.7	539.9	3.5
Gas Utilities	21.0	50.1	138.6	56.4	12.6
Communications and Other	488.0	506.3	3.8	601.9	18.9
Trade and Services	310.6	401.6	29.3	472.0	17.5
ALL NON-MANUFACTURING	1 789.7	2 070.3	15.7	2 350.4	13.5
ALL BUSINESS	4 127.7	5 057.7	22.5	5 133.5	1.5

Source: Same as Table 14.

Table 17

Employee Safety and Health Investment
as a Percentage of Capital Spending, U.S.A.
1972-1979

Industry	1972	1973	1974	1975	1976	1977	1978	1979
	%	%	%	%	%	%	%	%
Iron and Steel	12.3	6.9	3.5	1.9	0.9	1.2	1.7	1.8
Non-ferrous Metals	3.1	4.2	4.6	6.6	3.2	1.8	1.6	2.4
Electrical Machinery	2.4	2.1	2.0	2.6	2.9	2.3	2.2	2.1
Machinery	3.0	3.9	3.2	2.3	1.9	2.4	3.2	1.9
Autos, Trucks and Parts	4.8	4.4	8.6	2.4	1.1	3.4	2.2	4.2
Aerospace	3.3	4.0	4.4	3.5	4.4	3.5	2.6	3.0
Other Transportation Equipment	2.4	1.6	1.4	2.9	1.8	1.9	7.7	N/A
Fabricated Metals	1.3	1.8	2.3	1.5	1.4	4.6	2.9	3.2
Instruments	1.7	3.0	7.7	10.1	2.6	2.2	3.0	3.2
Stone, Clay and Glass	2.5	4.7	4.9	5.9	3.3	4.4	3.1	0.9
Other Durables	2.3	2.2	2.5	3.8	1.9	2.5	4.8	N/A
TOTAL DURABLES	3.4	3.5	4.2	3.4	2.1	2.8	2.9	2.6
Chemicals	2.1	2.0	2.1	3.2	3.5	3.1	3.5	3.3
Paper and Pulp	3.6	3.1	1.7	2.2	2.1	1.2	2.2	1.2
Rubber	1.4	2.2	8.4	5.7	2.4	2.5	1.7	2.2
Petroleum	1.3	3.6	2.7	2.5	1.1	1.8	3.2	0.9
Food and Beverages	2.8	2.7	2.4	2.7	4.0	3.0	3.4	1.9
Textiles	7.9	5.7	5.8	5.7	4.0	8.0	6.7	7.7
Other Non-durables	1.9	0.8	1.6	1.9	2.2	4.8	3.2	3.9
TOTAL NON-DURABLES	2.4	2.7	2.8	2.9	2.5	2.7	3.2	2.2
ALL MANUFACTURING	3.0	3.1	3.5	3.1	2.3	2.7	3.1	2.4
Mining	3.5	3.1	4.8	2.8	1.8	3.3	1.3	1.0
Railroads	1.7	1.5	2.0	2.0	6.4	1.0	2.8	2.0
Airlines	2.2	1.7	1.3	1.5	4.5	0.8	8.2	1.5
Other Transportation	4.8	4.2	1.7	2.8	1.7	4.5	2.7	1.2
Communications	3.4	3.5	2.3	2.1	2.3	2.1	2.2	1.2
Electric Utilities	1.4	0.9	1.3	1.0	0.8	0.9	1.8	0.9
Gas Utilities	0.9	1.1	1.5	0.9	1.3	1.9	0.5	0.3
Trade and Services	3.5	2.4	2.9	2.4	1.7	1.8	3.7	1.2
ALL NON-MANUFACTURING	3.0	2.4	2.5	2.1	1.8	1.9	2.8	1.1
ALL BUSINESS	2.7	2.6	2.8	2.4	2.0	2.2	2.9	1.6

Source: Same as Table 14.

Table 18

Employee Safety and Health Investment
as a Percentage of Capital Spending, U.S.A.
1980-1984

Industry	Actual 1980	Planned 1981	Planned 1982-1984 Average
	%	%	%
Iron and Steel	1.1	1.2	1.0
Non-ferrous Metals	2.0	1.9	1.5
Electrical Machinery	1.7	1.6	0.9
Machinery	3.3	2.5	3.6
Autos, Trucks and Parts	1.0	1.7	1.6
Aerospace	0.4	0.5	0.6
Fabricated Metals	1.2	1.4	1.1
Instruments	1.2	2.0	1.1
Stone, Clay and Glass	3.5	4.5	2.0
Other Durables	1.9	2.8	1.2
TOTAL DURABLES	1.5	2.2	1.8
Chemicals	3.6	4.2	5.0
Paper and Pulp	1.5	1.6	1.2
Rubber	8.4	12.8	3.5
Petroleum	0.8	0.7	0.3
Food and Beverages	2.0	2.1	2.1
Textiles	7.9	9.5	7.7
Other Non-durables	1.8	1.7	2.4
TOTAL NON-DURABLES	2.2	2.4	2.0
ALL MANUFACTURING	2.0	2.2	1.8
Mining	2.7	2.7	2.6
Railroads	2.1	3.1	2.9
Airlines	1.3	1.3	1.2
Electric Utilities	1.7	1.7	1.7
Gas Utilities	0.3	0.6	0.5
Communications and Other	1.2	1.2	1.1
Trade and Services	0.4	0.4	0.5
ALL NON-MANUFACTURING	1.0	1.0	1.0
ALL BUSINESS	1.4	1.5	1.3

Source: Economics Department, McGraw-Hill, "Annual McGraw-Hill Survey of Investment in Employment Safety and Health," mimeographed (New York: McGraw-Hill, 1972-1979)

1.4 Capital Spending on Accident Prevention in Canadian Industries

Because of the difficulty, if not the impossibility, of obtaining Canadian employers' accident prevention expenditures, a conjecture on the costs was carried out in the following manner: based on the McGraw-Hill Survey Report and the Canadian Capital Expenditure data from Statistics Canada, accident prevention costs were estimated for given hypothetical percentages of capital spending on workers' safety and health. Table 20 presents these results. By comparing the work injury direct costs with the different levels of accident prevention costs, and recalling that the work injury costs were higher than the employers' annual investments for employee safety and health program, one may conclude that the Canadian accident prevention expenditures might never have exceeded one per cent of the total annual investment. If this conjecture holds firm, then Canadian industries might not have invested more than $765 million for employee safety and health in 1981.

Table 19

Capital Expenditures and Estimated Investments for Employees' Safety and Health, and Work Injury Direct Costs in Canada, 1971-1981[1]

Year	Capital Expenditures in $Millions[2]	Estimated Safety and Health Investment Levels Based on Hypothetical Proportions of Capital Expenditures ($millions)[3]				Work Injury Direct Costs Based on Claims ($thousands)[4]
		0.5%	1%	2%	3%	
1971	20 184.0	100.9	201.8	403.7	605.5	319.0
1972	22 218.0	111.1	222.2	444.4	666.5	368.0
1973	26 618.1	133.1	266.2	532.4	798.5	426.0
1974	32 882.2	164.4	328.8	657.6	986.5	521.0
1975	38 216.2	191.1	382.2	764.3	1 146.5	657.0
1976	43 636.3	218.2	436.4	872.7	1 309.1	775.0
1977	46 597.5	233.0	466.0	932.0	1 397.9	857.0
1978	50 359.6	251.8	503.6	1 007.2	1 510.8	995.0
1979	58 354.4	291.8	583.5	1 167.1	1 750.6	1 099.0
1980	65 411.7	327.1	654.1	1 308.2	1 962.4	1 198.0*
1981	76 523.2	382.6	765.2	1 530.5	2 295.7	1 330.0*

[1]Excludes Northwest Territories and Yukon.

[2]Source: Private and Public Investment in Canada, Catalogue 61-205 Annual Statistics Canada outlay.

[3]Estimate was based on the assumptions on the allocation levels (%) of the capital expenditures for accident prevention.

[4]Includes cost of claims originating in previous years and compensation in the given years reported by Workers' Compensation Boards.

*Predicted.

1.5 Estimated Costs of Compliance with Occupational Safety and Health Legislation

When the 1970 OSH Act was introduced in the United States, it was generally agreed among manufacturers that the long-term impact of the occupational safety and health legislation would be increased productivity industry-wide of at least 15 per cent. Meanwhile, though, the short-term impact, especially for those companies that have been operating with obsolete, fully capitalized equipment, would be devastating. The additional costs attributable to the OSH Act can be seen in Chart 4 after the year 1970. All industries allocated higher proportions of capital spending for safety and health in the first two to three years than in subsequent years. This suggests that even in more modern plants, the costs of compliance with the OSH Act may have increased the costs of operations by as much as 5 to 10 per cent. Ashford listed the following important costs of compliance with the Act:

- Increased in-plant services in the areas of industrial safety, industrial hygiene, and occupational medicine.

- Process changes such as the implementation of closed manufacturing systems to minimize or eliminate exposure to toxic or carcinogenic substances; improved ventilation to reduce exposure to potentially harmful industrial dusts; and acoustical redesign to reduce or eliminate noise pollution.

- Design of new equipment to meet the objective of improved occupational safety and health; for example, the development of a new, quieter loom that generates less cotton dust.

- Development and implementation of substitutes for hazardous and carcinogenic materials, such as fiberglass in place of asbestos.

- Changes in the organization of work to reduce the level of occupational hazard; for example, instituting longer rest periods, shortening the working day, reducing the pace of work, and implementing job rotation to reduce the possibility of chronic or long-term exposure to hazards such as noise.

- Education of workers and employers as to their rights and duties regarding the provision of improved working conditions; improved orientation of newly hired workers; technical training to enhance the capability of working people to monitor the hazards of their job environment and take the necessary steps to alleviate hazardous conditions.

- Health research on the broader implications of occupational hazards in terms of workers' physical and mental well-being; increased research effort regarding the preventive (as opposed to the curative or treatment) aspects of occupational medicine.

. Manpower development for the detection and prevention of occupational hazards.

It should be pointed out that many industries, some of which were already in compliance with OSHA, voluntarily invested in safety and health measures such as machine guarding, plant industrial hygienists, and allocating person-hours to clear obstructions in working areas. Some other costs were incurred indirectly as a result of the legislation. This made the cost calculation difficult. Therefore, any estimate would be, at best, a very rough one[1], certain cost items being attributable either to the safety and health laws or to employers' voluntary investment.

Despite all the difficulties in identifying the additional safety and health expenditures caused by OSHA, the National Association of Manufacturers (NAM) and Northrup et al. conducted surveys independently of the McGraw-Hill study. The results are reproduced in Tables 20 and 22. The average estimated expense per worker by this survey was $292, and that by the NAM Survey was $260 over the period of 1976-1977. The NAM Survey shows that the average cost per worker marginally decreases as company size increases.

[1]Northrup et al., "The Impact of OSHA", lists a number of examples.

CHART 5

ESTIMATED COST PER WORKER OF COMPLIANCE
WITH OSHA STANDARDS, BY COMPANY SIZE (1976-1977)

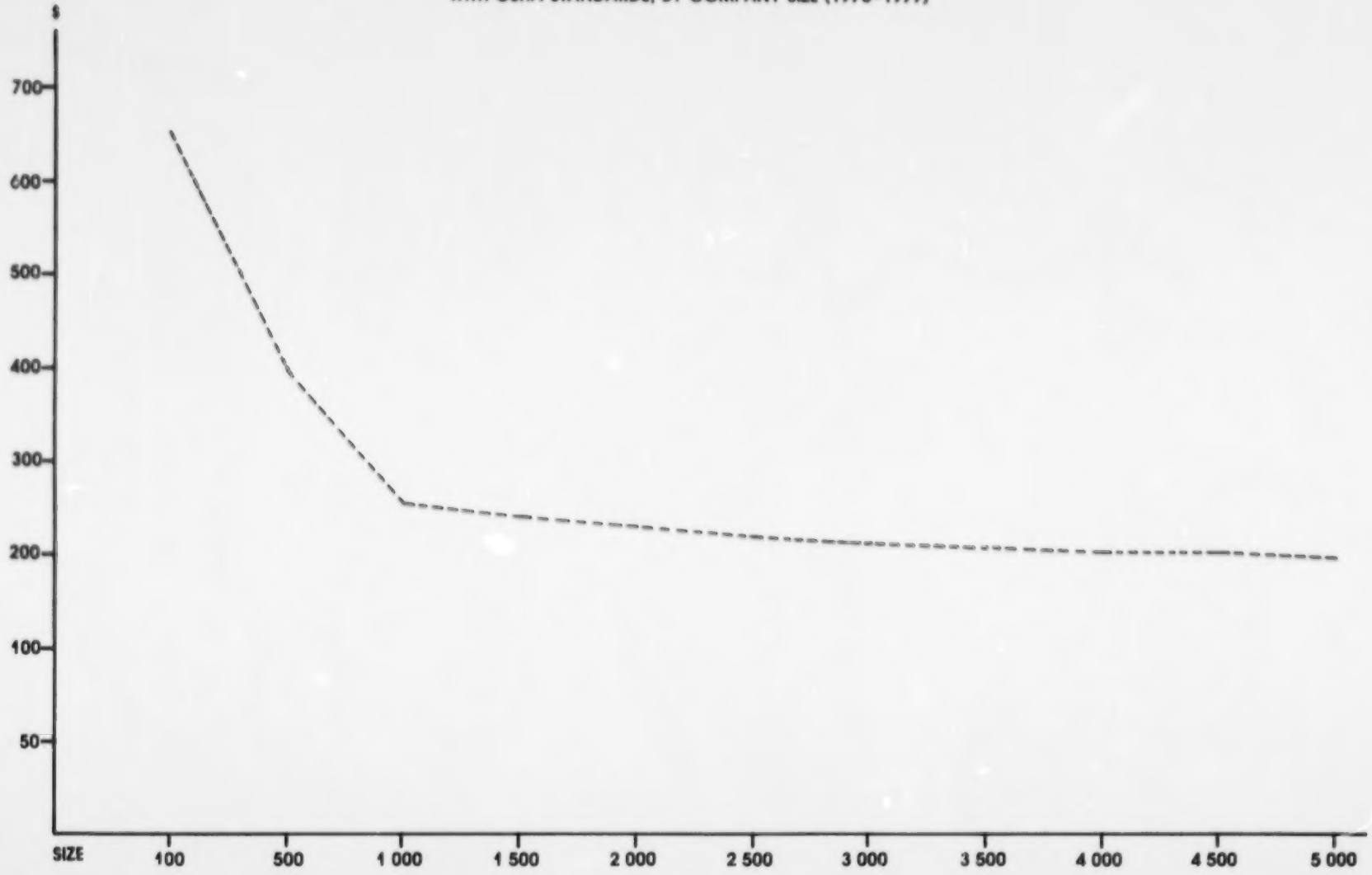

Table 20

Estimated Total Cost of Compliance with OSHA Standards, NAM Survey

Company Size (no. of employees)	Estimated Total Expense (weighted average)	Estimated Expense Per Worker
1 - 100	33 000	660
101 - 500	104 000	400
501 - 1 000	212 000	270
1 001 - 2 000	372 000	250
2 001 - 5 000	863 000	245
over 5 000	7 146 000	-
		Average $260

Source: Ashford, Crisis in the Workplace, pp.318, based on NAM Survey. Refer to 1976-1977 $ used as base.

Table 21

Estimated Total Cost of Compliance with OSHA Standards, Industrial Research Unit Aerospace Questionnaire, 1976-1977

	Estimated Total Expense		Company Size (no. of employees)		Estimated Expense Per Worker
	60 000		818		73.35
	50 000		1 055		47.39
	50 000		1 289		38.79
	300 000		2 567		116.87
	350 000		3 400		102.94
	50 000		4 474		11.18
	500 000		6 695		74.68
	20 000 000		7 050		2 836.88
	2 000 000		7 126		280.66
	3 250 000		9 585		339.07
	2 100 000		9 750		215.38
	3 500 000		9 759		358.64
	700 000		10 124		69.14
	60 000		11 475		5.23
	1 000 000		13 991		71.47
	8 553 792		23 576		362.82
	6 000 000		26 500		226.42
	10 000 000		51 292		194.96
Total	$58 523 792	÷	200 526	=	$291.85

Source: Industrial Research Unit Aerospace Questionnaire, "The Impact of OSHA" by H.R. Northrup et al. University of Pennsylvania, Industrial Research Unit.

1.6 Workers' Compensation Boards' Accident Prevention Expenditures in Canada 1978-1979

To promote industrial health and safety and to eliminate conditions and factors which may lead to industrial injury and disease, each WCB engages in a number of safety activities. These activities include industrial hygiene and mechanical standard inspections, first aid services, research, education, laboratory services, safety meetings, enforcement with respect to manufacturing and processing operations; development of safety standards, and the like. The programs vary between provinces. As shown in Table 22, approximately 3 per cent of the compensation payments was spent on the safety activities.

Table 22

Direct Compensation Costs vs. WCB Accident Prevention Expenditures

	Compensation Cost ($000s)		WCB Accident Prevention Expenditures ($000s)(%)	
	1978	1979	1978	1979
British Columbia	132 452	159 816	6 742(5.09%)	6 985(4.37%)
Alberta	73 887	86 431	2 723(3.69%)	3 249(3.76%)
Saskatchewan	29 847	35 648	1 143(3.83%)	1 236(3.47%)
Manitoba	21 459	24 578	703(3.28%)	724(2.95%)
Ontario	402 940	431 195	13 484(3.35%)	15 277(3.54%)
Quebec	280 594	298 725	4 068(1.45%)	4 858(1.63%)
New Brunswick	17 377	21 110	637(3.67%)	740(3.51%)
Nova Scotia	25 486	29 033	210(0.82%)	236(0.81%)
Prince Edward Island	2 015	2 598	22(1.09%)	32(1.23%)
Newfoundland	10 218	9 528	47(0.46%)	566(5.94%)
Total	994 260	1 098 662	29 779(3.00%)	33 903(3.09%)

Note: Percentages are in relation to the compensation cost.

1.7 Occupational Safety and Health Joint Committees, Costs and Funding

It is generally agreed that a company which enjoys an effective occupational safety and health record has the following traits. The union consistently supplies management with information, suggestions, and advice which management values. While the union representatives favour a cooperative strategy and engage in problem solving, at the same time they mix this strategy with a willingness to apply pressure when necessary to obtain action.

However, as Table 23 shows, in Canada 30.4 per cent of the workers in the industries listed have no provision for safety committees or safety programs.

Only 31.8 per cent of workers work in establishments with provisions for safety programs and safety committees, 12.8 per cent have safety committees only, and 25 per cent have safety programs only.

Saskatchewan and Quebec have introduced joint safety committees as a legal requirement. The committees are composed of both labour and management representatives. The cost impacts on the provincial industries of the requirements for formation of safety committees are difficult to estimate.

Table 23

Industrial Safety Committees as of March 1981 (Canada-wide)

Industry Group	No Provision	Safety Program	Safety Committee	Safety Program and Committee	Total Workers
	(figures in brackets are percentages)				
Forestry	980 (5.2)	7 665 (40.4)	1 695 (8.9)	8 645 (45.5)	18 985
Fishing	2 750 (21.2)	8 720 (67.2)	-	1 550 (12.0)	12 970
Mining	1 255 (1.9)	3 850 (5.9)	1 635 (2.5)	58 305 (89.6)	65 045
Manufacturing	91 393 (15.4)	108 490 (18.3)	116 915 (19.8)	275 118 (46.5)	591 916
Transport, Communications and Utilities	122 590 (29.7)	154 496 (37.4)	16 995 (4.1)	119 010 (28.8)	413 091
Trade	36 200 (32.5)	22 410 (20.1)	18 810 (16.9)	33 955 (30.5)	111 375
Financial Insurance	640 (10.0)	1 455 (22.6)	3 360 (52.3)	975 (15.2)	6 430
Community, Business and Personal Service	430 965 (58.3)	84 570 (11.4)	132 170 (17.9)	91 290 (12.4)	738 995
Public Administration	65 320 (12.7)	225 937 (44.1)	24 830 (4.8)	196 435 (38.3)	512 522
Total	752 093 (30.4)	617 593 (25.0)	316 410 (12.8)	785 233 (31.8)	2 471 329

Source: Provisions in Collective Agreements in Canada covering 200 and more employees, March 1981, Labour Canada.

1.8 Quebec Case (Table 25)

The report ("Occupational Health and Safety", 1977, Government of Quebec) states the following:

The operating costs of the joint committees will come primarily from the members' time for which the employer will have to pay in lieu of the regular hours worked. It is impossible to predict accurate figures for several reasons. First, the number of companies that will choose to have joint committees is not known. Secondly, the frequency and length of meetings may vary considerably from one company to the next. The same may be said of the number of labour and management representatives on the committee. Despite their difficulties, the government wanted to get an idea of the cost of operating joint committees. The estimates which are shown in the tables are based on the most "realistic" assumptions and on current figures. The operation of joint committees could cost an annual average of $1 954 to $11 570 per industry depending on its size. The procedure of setting up joint committees would first be implemented in the industries with more than 10 workers that have an average annual accident and disease rate of six per hundred workers or higher and an annual average of days lost per accident of 40 or higher. If all the provinces set up joint committees, according to Statistics Canada and the Commission des accidents du travail, there would be some 8 000 in all.

Based on Saskatchewan's experience in setting up the committees, the members and company sizes are as follows:

Table 24

Safety Committee Size

Members	Company Size (Workers)
4	10 - 100
6	100 - 499
10	500 +

Table 25

Estimated Operating Costs of Joint Committees by Type of Coverage, Quebec Case (1978 Dollars)

Company Size	Number of Firms Involved	Number of Representatives		Joint Committee Meetings		Joint Committee Control Visits	
		Per Committee	For All Companies	No/ year	Length in hours	No/ year	Length in hours
10 - 49	5 990	4	23 950	4	2	4	2
50 - 99	970	4	3 880	12	2	4	2
100 - 199	576	6	3 640	12	2	4	2
200 - 499	315	6	1 955	12	3	12	3
500 and over	131	10	1 314	12	3	12	4
Total	7 982		34 559				

Training Information for Joint Committees				Total Annual Person-Hours	Average Hourly Wages and Fringe Benefits	Cost of Time Freed (per year)	Support Costs	Total Cost Per Year	Average Annual Cost Per Company
No/ year	Length in hours	No/ year	Length in hours						
					$	$	$	$	$
6	4	2	5	1 197 500	8.50	10 178 750	1 526 812	11 705 562	1 954
6	4	2	5	256 080	8.50	2 176 680	326 502	2 503 382	2 580
6	4	2	5	228 360	8.50	1 941 060	291 159	2 232 219	3 375
6	4	2	5	207 230	8.50	1 761 455	264 218	2 025 673	6 430
6	4	2	5	155 052	8.50	1 317 942	197 691	1 515 633	11 570
				2 044 222	8.50	17 375 887	2 606 382	19 982 469	2 503

Source: Occupational Health and Safety, Gouvernement du Québec, 1978.

1.9 Cost-Effective Safety Activities

In 1976, after concluding a survey on 140 Texas chemical, paper, and wood product manufacturing firms, Foster C. Rinefort undertook a study on cost-effective safety activities. The criterion of cost-effectiveness was established by comparing the cost for the safety activities per employee and the work injury cost per employee. He categorized the industries by the size of firms within each industry. Small firms employed fewer than 50 full-time people, medium-sized firms employed between 50 and 200 full-time people, and large firms employed more than 200. The combination of variables used for estimating differences between firms with low work injury costs and those with high work injury costs were:

- management activities regarding safety
- safety and health staff
- safety orientation of new employees
- safety rules
- activities designed to maintain employee interest in safety
- safety meetings
- safety inspections
- personal protective equipment
- guarding or the correction of unsafe physical conditions
- physical examinations
- medical or injury treatment facilities and staff
- off-the-job safety activities
- safety training for experienced employees
- safety records keeping activities
- the number of full-time equivalent employees
- span of control, defined as the number of hourly employees for each first line supervisor.

The cost effectiveness for the 16 safety activities listed above was to provide an estimate of the effect of spending. The measurement of the effectiveness is given as one dollar per employee per

a certain safety activity as compared to the cost of work injuries per employee. One result of such expenditure may be a large decrease in work injury costs, indicating a cost-effective activity. A second possible outcome of the expenditure was a decrease in work injury costs to the employer less than the cost of the activity or between $0.01 and $1.00 per dollar per employee spent on the safety activity. This outcome was labelled partially cost-effective. A third possible outcome was an increase in work injury cost, indicating that firms which spent more for such activities also experienced higher work injury costs. This outcome was labelled cost-ineffective.

In Table 26, activities which are located above the horizontal line in each grouping of data by industry and size were cost-effective or caused a reduction in work injuries greater than the expenditure for the activity. Those activities listed below the horizontal line were not cost-effective.

However, the study does not conclude that cost-ineffective activities are not desirable. It suggests that at current levels of spending, further reduction of work injury costs in the industries studied may best be achieved by directing further expenditures toward the most cost-effective variables. As Table 27 shows there are no easy, simple answers to the question of how best to reduce work injury costs; but there is a relationship between the cost of safety activities and the work injury costs.

However, the costs for both safety activities and accidents as presented in Table 27 may vary depending on the combination of safety programs. As indicated earlier, more emphasis should be placed on the non-engineering aspects, namely human factors.

Those variables which were cost-effective, listed in decreasing order of cost-effectiveness, were: safety rules, off-the-job safety activities, safety training, safety orientation, safety meetings, and medical facilities, staff and supplies. Safety rules were the most cost-effective activity, because firms which spent larger amounts of money to develop and distribute safety rules evaluated the hazards of many jobs and communicated much of this information in a useful form to employees. The proportions (%) of the total cost of safety activities and of injuries in terms of average annual wages for the industries included in the study are listed in Table 27.

Table 26

Decreasing Rank Order of the Cost-Effectiveness of Selected Variables Upon the Cost of Work Injuries Per Employee for Texas Chemical, Paper, and Wood Product Firms

Size of Firm	Chemical	Paper	Wood Products
Small	Off-the-job	Off-the-job	Orientation
	Records	Physicals	Training
	Training	Orientation	Meetings
	Rules	Staff	Management
	Inspections	Span Control	Span Control
	Guarding	Guarding	Rules
	Management	Inspections	Equipment
	Staff	Meetings	Physicals
	Orientation	Management	Interest
	Equipment	Medical	
	Physicals	Records	
Medium	Management	Medical	Rules
	Off-the-job	Training	Training
	Rules	Equipment	Management
	Medical	Interest	Medical
	Equipment	Orientation	Staff
	Training	Span Control	Span Control
	Meetings	Guarding	Guarding
	Span Control	Inspections	Meetings
	Orientation	Physicals	Orientation
	Interest	Management	Physicals
	Physicals	Rules	Records
	Records		
Large	Off-the-job	Off-the-job	Medical
	Physicals	Records	Records
	Inspections	Interest	Interest
	Medical	Inspections	Span Control
	Training	Meetings	Meetings
	Span Control	Training	Guarding
	Guarding	Span Control	Physicals
	Staff	Staff	Orientation
	Orientation	Orientation	Staff
	Records	Management	Training
	Interest		Equipment
	Management		Rules
			Management

Note: The activities listed above the horizontal line in each grouping were cost-effective. The activities below the horizontal line were cost-ineffective.

Source: Foster, R.C. Jr., "A Study of Some of the Costs and Benefits Related to Occupational Safety and Health in Selected Texas Industries", 1976.

Table 27

Hourly Wage, Safety Program Cost, Work Injury Cost in Three Industries

	Industry		
	Chemical	Paper	Wood Products
	$	$	$
Hourly Employee Annual Wages	10 092	8 136	6 274
Safety Program Costs as Percentage of Wages	6.1%	3.3%	3.1%
Work Injury Costs as Percentage of Wages	2.3%	3.8%	10.6%
Both Safety Program and Injury Costs as Percentage of Wages	8.4%	7.1%	13.7%

CHAPTER 2

INDUSTRIES UNDER FEDERAL JURISDICTION; PART IV CANADA LABOUR CODE

The purpose of this chapter is to review the costs, in terms of dollars and days lost, experienced by the industries under the federal jurisdiction. About 3 500 employers are now covered by Part IV of the Canada Labour Code, which is concerned with occupational safety and health matters. Put another way, 600 000 workers are governed by the Code on safety and health matters in the workplace. Each year, employers with five or more workers are requested to report to Labour Canada their annual accident experience. The employers who are required to report to Labour Canada account for 71.4 per cent of the total, or 2 500 employers. This represents about 450 000 workers. The employers are classified into the following 15 industries:

1. Air Transport
2. Banking
3. Bridges and Tunnels
4. Broadcasting
5. Communications
6. Crown Corporations
7. Feed, Flour and Seed
8. Grain Elevators
9. Longshoring
10. Mining
11. Pipelines
12. Postal Contractors
13. Railways
14. Road Transport
15. Water Transport

2.1 Work Injury Costs Under Federal Jurisdiction

As we may notice in the reporting form (Appendix 6), no exact work injury costs are available. However, based on average cost per injury claim in each province as calculated from Workers' Compensation Board data, the direct cost of work injuries in federal jurisdiction industries for each province and the cost for Canada can be estimated. This is done in Table 28.

Table 28

Estimated Work Injury Direct Costs[1] by Province,
Federal Jurisdiction Industries, 1973-1979

Year	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Terr.	Total
					Cost in $000s (figures in brackets are percentages)							
1973	133(.5)	10(-)	1 629(6.0)	1 271(4.7)	8 046(29.7)	6 384(23.6)	2 005(7.4)	1 133(4.2)	3 628(13.4)	2 675(9.9)	174(.6)	27 088
1974	167(.5)	11(-)	2 204(7.0)	1 202(3.8)	8 410(26.8)	8 223(26.2)	2 388(7.6)	1 171(3.7)	3 272(10.4)	4 025(12.8)	290(.9)	31 363
1975	153(.4)	9(-)	2 428(6.8)	1 061(3.0)	9 529(26.8)	10 771(30.3)	1 990(5.6)	1 148(3.2)	2 970(8.4)	4 930(13.9)	548(1.5)	35 537
1976	174(.4)	12(-)	3 321(8.0)	1 105(2.7)	10 407(25.0)	13 124(31.5)	2 744(6.6)	1 216(2.9)	3 719(8.9)	5 439(13.1)	363(.9)	41 624
1977	258(.6)	13(-)	3 944(8.6)	647(1.4)	10 910(23.9)	14 889(32.6)	2 622(5.7)	1 408(3.1)	4 223(9.3)	6 319(13.9)	390(.9)	45 623
1978	338(.7)	22(-)	3 874(7.5)	678(1.3)	12 982(25.1)	18 256(35.3)	2 848(5.5)	1 652(3.2)	3 867(7.5)	6 992(13.5)	242(.5)	51 751
1979	325(.5)	37(.1)	4 093(6.9)	1 486(2.5)	15 797(26.5)	19 510(32.8)	3 524(5.9)	1 684(2.8)	3 623(6.1)	9 168(15.4)	262(.4)	59 509

[1]Costs are estimated by taking the average claim cost at the provincial level and multiplying by the number of accidents reported by employers. Direct costs include medical costs, compensation for lost wages and pension payments made.

Figures may not total due to rounding.

Table 29

Estimated Total Cost[1],
Federal Jurisdiction Industries, 1973-1979

Year	Direct Costs (in $000s)	Total Costs[1] (Direct and Indirect Costs in $000s)									
		Times									
		2	3	4	5	6	7	8	9	10	11
1973	27 088	54 176	81 264	108 352	135 440	162 528	189 616	216 704	243 792	270 880	297 968
1974	31 363	62 726	94 089	125 452	156 815	188 178	219 541	250 904	282 267	313 630	344 993
1975	35 537	71 074	106 611	142 148	177 685	213 222	248 759	284 296	319 833	355 370	390 907
1976	41 624	83 248	124 872	166 496	208 120	249 744	291 368	332 992	374 616	416 240	457 864
1977	45 623	91 246	136 869	182 492	228 115	273 738	319 361	364 984	410 607	456 230	501 853
1978	51 751	103 502	155 253	207 004	258 755	310 506	362 257	414 008	465 759	517 510	569 261
1979	59 509	119 018	178 527	238 036	297 545	357 054	416 563	476 072	535 581	595 090	654 599

[1]See text for an explanation of the estimation procedures for indirect and total costs. Total Cost = Direct Cost + Indirect Cost
Indirect Cost = x times Direct Cost.

2.2 Workdays Lost, Employers Under Federal Jurisdiction

During the study period, 120 210 non-fatal disabling injuries and 221 fatalities were reported by employers under federal jurisdiction*. The time lost is estimated to be more than 3 million productive workdays (Table 30).

Table 30

Injury Experience and Days Lost,
Federal Jurisdiction Industries,
1973-1979

Year	Non-fatal Injuries	Estimated Days Lost[1]	Fatal Injuries	Evaluated Days Lost for Fatalities[2]	Estimated Total Days Lost[3]
1973	14 697	367 425	20	3 000	370 425
1974	16 941	423 525	25	3 750	427 275
1975	15 304	382 600	39	5 850	388 450
1976	17 100	427 500	39	5 850	433 350
1977	18 042	451 050	33	4 950	456 000
1978	18 709	467 725	14	2 100	469 825
1979	19 417	485 425	51	7 650	493 075
Total	120 210	3 005 250	221	33 150	3 038 400

Note:

[1]No. of Non-fatal Injuries x (25 days + Waiting Period)

[2]No. of Fatal Injuries x 150 days

[3](1) + (2)

*Canadian Employment Injuries and Occupational Illnesses, 1979, Labour Canada.

CHAPTER 3

FEDERAL PUBLIC SERVICE DEPARTMENTS, AND CROWN CORPORATIONS AND AGENCIES

This chapter reviews work injury costs to the federal government.

Labour Canada handles compensation claims on behalf of employees of the federal public service of Canada, crown corporations and agencies in accordance with the Government Employees Compensation Act. Claims are administered by the provincial Workers' Compensation Boards. The number of employees covered by the Act in fiscal year 1978-1979 was approximately 355 000; of this number, 310 000 were under Treasury Board Occupational Safety policy. The total cost of all compensation benefits defrayed each year continues climbing. Since 1974, disbursements for medical and hospital services and compensation for lost wages have increased 38 per cent in the federal public service, and 30 per cent in crown corporations and agencies. To this must be added the amount paid to the Workmen's Compensation Boards for their administration services, which is about 10 to 20 per cent of the total costs.

Table 33 shows the compensation expenditures by fiscal year during the period 1969-1970 to 1979-1980. The expenditures are the payments disbursed by all Workers' Compensation Boards for settled cases only, and do not include injury leave cost for lost salaries. The cost figures are based on the invoices sent by each board to Financial Services of Labour Canada. The cost figures may include historical costs as well. They do not categorize costs by injury type.

To record more accurate figures, an open-ended system for updating cost figures and workdays lost by injury type may be required which accommodates all active files in the system. This inevitably necessitates large EDP storage and processing capacity and human resources. To reduce these requirements, Labour Canada designed a system about 12 years ago, which has a cut-off date for the update. Currently, the computer system updates for at least two-and-a-half years and up to three-and-a-half years, depending on the month and the year of the first entry of data entry into the system. For example, a case which was opened in fiscal year 1978-1979 will remain open for updating during the following years:

April 1978 to March 31, 1979
April 1979 to March 31, 1980
April 1980 to March 31, 1981

So, regardless of the date of the accident, a claim coded by a pertinent region and sent to Ottawa for data processing at the beginning of fiscal year 1978-1979 will be updated on a master file until March 31, 1981, plus an extension of six months, before being transferred to a historical file. This is a total of three-and-a-half years. However, a claim which entered the system on March 31, 1979 will be updated two years and a half. Coded data entered into the system in April 1980 would be updated until 1983, completing a three-and-a-half year update period.

The rationale behind this approach is that about 98 per cent of WCB claims are closed within a two-year period, as shown in Table 9.

As shown in Tables 31 and 32 the days lost and the costs accumulated in the final reports two years after the initial report may be estimated by multiplying the initial days lost and cost figures by 1.3 and 1.5, respectively.

An imputation procedure was applied to estimate work injury costs when they were not recorded in the source documents. For instance, when days lost and cost figures were not recorded, $104 for medical-aid-only cases and $1 710 for lost-time cases were used in the fiscal year 1978-1979. Also, 30 days was used as an estimate of calendar days lost, and 21 days (68 per cent of 30 days) for working days lost. The estimated costs are indexed by consumer price index and personal health care index annually. Table 35 shows the resultant estimates of the costs.

The average work injury costs and the days lost over the years in the federal public service are lower than those in the federal crown corporations and agencies, as shown in Table 36. This may be due to the fact that the number of blue collar workers in the corporations is 54 per cent as opposed to only 27 per cent in the public service.

Table 31

Comparison of Days Lost and Compensation Costs Accumulated at End of Fiscal Year and Two Years Later, 1970-1976, Federal Public Service

	DAYS LOST			TOTAL COSTS		
	Initial Report	Final Report	Ratio F:I	Initial Report	Final Report	Ratio F:I*
1970-71	188 770	220 320	1.1671	4 204 547	6 094 047	1.4494
1971-72	174 337	233 767	1.3409	4 569 094	6 620 648	1.4490
1972-73	216 210	268 400	1.2414	5 404 115	7 863 138	1.4550
1973-74	218 365	273 615	1.2530	5 847 129	8 745 385	1.4957
	Average Ratio: 1.2506			Average Ratio: 1.4623		
	Estimated Final Figures					
	Initial	Estimated		Initial	Estimated	
1974-75	222 159	277 830		6 460 907	9 447 780	
1975-76	232 055	290 210		8 567 563	12 528 350	

*F = Final
I = Initial

Table 32

Comparison of Days Lost and Compensation Costs Accumulated at End of Fiscal Year and Two Years Later, Employers not Under Treasury Board

	Crown Corps. and Agencies			Cape Breton Development Corp.		
	DAYS LOST					
Year	Initial Report	Final Report	Ratio F:I	Initial Report	Final Report	Ratio F:I
1970-71	15 891	19 885	1.251	50 921	58 280	1.145
1971-72	12 483	16 780	1.344	48 435	59 083	1.220
1972-73	16 254	19 868	1.222	52 843	56 801	1.075
1973-74	17 971	24 411	1.358	42 065	45 234	1.075
		Average Ratio	1.294		Average Ratio	1.129
	ESTIMATED FINAL FIGURES					
	Initial	Estimated		Initial	Estimated	
1974-75	18 655	24 140		44 432	50 163	
1975-76	19 305	24 981		48 120	54 327	
	Initial Report	Final Report	Ratio F:I	Initial Report	Final Report	Ratio F:I
1970-71	535 011	701 144	1.311	1 191 975	4 447 181	3.731
1971-72	398 774	523 966	1.314	2 648 287	6 558 478	2.476
1972-73	525 264	752 897	1.433	1 460 384	2 366 065	1.620
1973-74	660 421	1 338 908	2.027	1 339 354	1 993 989	1.489
		Average Ratio	1 521		Average Ratio	2.329
	Initial	Estimated		Initial	Estimated	
1974-75	917 502	1 395 520		1 509 201	3 514 929	
1975-76	991 753	1 508 456		1 590 171	3 703 508	

Table 33

Compensation Expenditures by Fiscal Year
(Federal Government)

1979-1980	Corporations	$11 105 287
	Departments	14 913 362
	Total	$26 018 649
1978-1979	Corporations	$ 9 413 500
	Departments	12 754 838
	Total	$22 168 338
1977-1978	Corporations	$ 8 913 258
	Departments	10 468 314
	Total	$19 381 572
1976-1977	Corporations	$ 7 258 194
	Departments	10 132 196
	Total	$17 390 390
1975-1976	Corporations	$ 5 871 842
	Departments	7 775 254
	Total	$13 647 096
1974-1975	Corporations	$ 4 934 924
	Departments	6 904 121
	Total	$11 839 045
1973-1974	Corporations	$ 3 250 612
	Departments	6 791 425
	Total	$10 042 037
1972-1973	Corporations	$ 2 783 832
	Departments	6 369 439
	Total	$ 9 153 271
1971-1972	Corporations	$ 2 273 967
	Departments	5 412 674
	Total	$ 7 686 641

Table 33 (continued)

1970-1971	Corporations	$ 2 260 962
	Departments	4 135 035
	Total	$ 6 395 997
1969-1970	Corporations	$ 2 463 152
	Departments	3 392 505
	Total	$ 5 855 657

Table 34

Work Injury Experience,
Federal Government Departments and Crown Corporations and Agencies,
1977-1978 and 1978-1979

Number of Injuries	Federal Departments	Federal Crown Corporations and Agencies
1977-1978		
Non-disabling	12 187	1 839
Disabling		
Injury Leave*	14 920	846
Compensation*	1 529	2 156
Permanent Partial Disability	151	71
Permanent Total Disability	1	0
Fatal	12	7
Total Disabling	16 613	3 080
Total Injuries	28 800	4 919
1978-1979		
Non-disabling	11 256	1 949
Disabling		
Injury Leave*	13 532	667
Compensation*	1 098	2 364
Permanent Partial Disability	219	113
Permanent Total Disability	0	1
Fatal	10	15
Total Disabling	14 859	3 160
Total Injuries	26 115	5 109

*Injury leave cases differ from compensation cases in that 100% of the wages during the time-loss period is paid by employers in injury leave cases.

Table 35

Work Injury Cost,
Federal Government Departments and Crown Corporations and Agencies,
1977-1978 and 1978-1979

Costs	Federal Departments	Federal Crown Corporations and Agencies
	($)	($)
1977-1978		
Medical Cost	2 312 851	377 138
Injury Leave Cost	13 051 071	804 431
Compensation Cost	2 223 597	3 176 721
Pension Awards (Capitalized Value)	1 182 260	775 772
Total Cost	18 769 779	5 134 062
1978-1979		
Medical Cost	3 246 777	1 021 213
Injury Leave Cost	11 143 842	622 430
Compensation Cost	1 487 621	3 179 590
Pension Awards (Capitalized Value)	1 951 312	1 258 201
Total Cost	17 829 552	6 081 434

CHART 6

AVERAGE WORK DAYS LOST 1971-1979

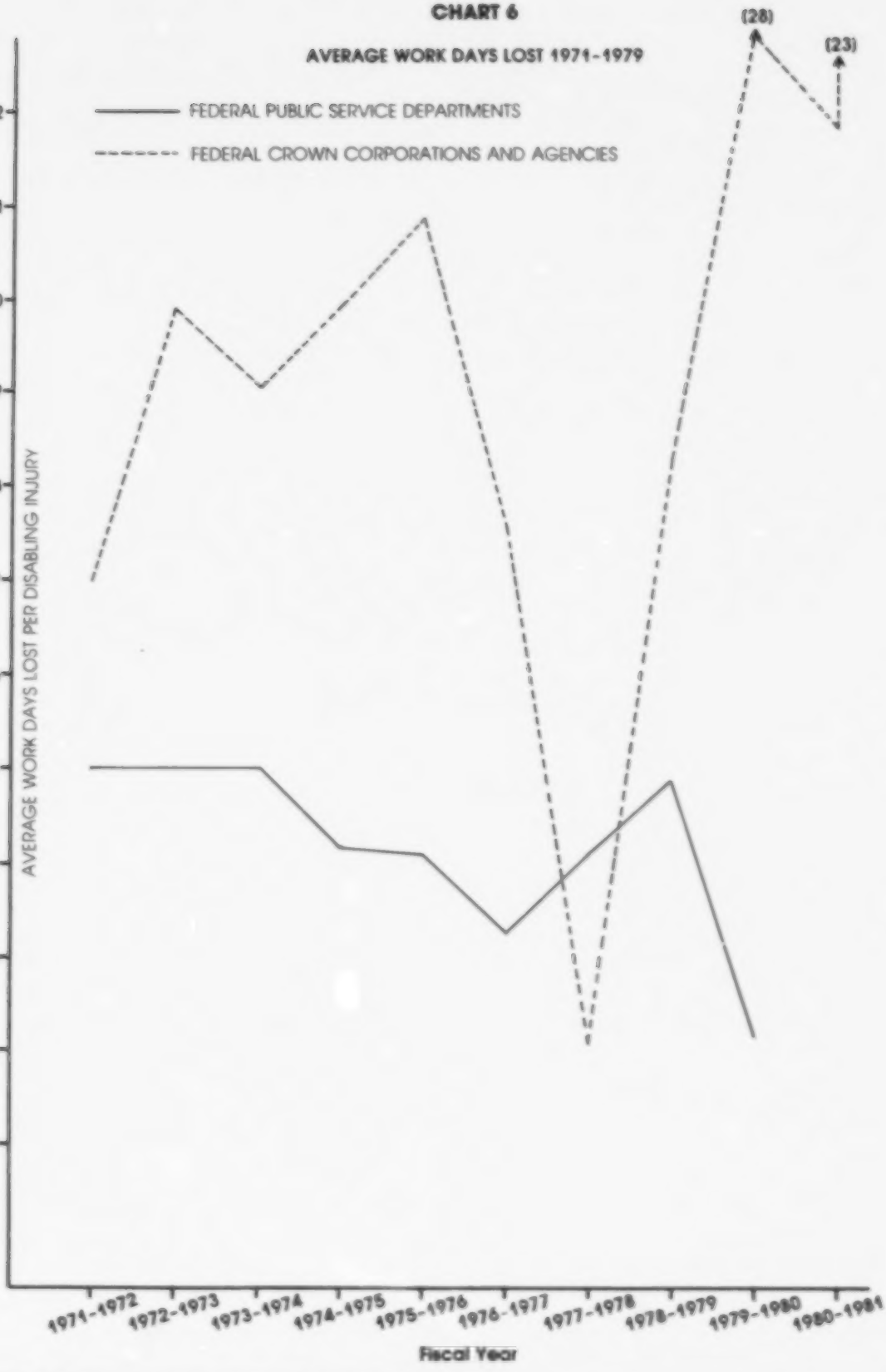

Table 36

Days and Workdays Lost by Workers Under Government Employees Compensation Act, 1971-1972 to 1979-1980

	Federal Public Service Departments			Federal Crown Corporations and Agencies		
Fiscal Year	Workdays Lost	Average Days Lost	Average Workdays Lost	Work-days Lost	Average Days Lost	Average Work-days Lost
1971-1972	160 000	22	15	52 000	25	17
1972-1973	184 000	22	15	53 000	29	20
1973-1974	187 000	22	15	48 000	28	19
1974-1975	187 000	21	14	54 000	29	20
1975-1976	187 000	21	14	56 000	31	21
1976-1977	186 000	19	13	49 000	25	17
1977-1978	234 000	19	14	53 000	17	12
1978-1979	222 000	21	15	88 000	35	28
1979-1980P	165 000	18	12	70 000	31	23

P Preliminary

Table 37

Estimated Fiscal Yearly Direct and Indirect Work Injury Costs for Federal Government Departments, Crown Corporations and Agencies under Government Employees Compensation Act, 1970-1971 to 1979-1980

Fiscal Year	Total Injuries	Total Estimated Direct Costs in $	Per Injury Direct Cost in $	Estimated Range of Indirect Costs[1] in $	Range of Indirect Costs Per Injury ($)
			Federal Crown Corporations and Agencies[2]		
1970-1971	4 419	5 148 325	1 165	20 592 000 - 51 480 000	4 660 - 11 650
1971-1972	4 674	7 082 444	1 515	28 328 000 - 70 820 000	6 061 - 15 152
1972-1973	4 215	3 118 962	740	12 476 000 - 31 190 000	2 960 - 7 400
1973-1974	4 006	3 332 897	832	13 332 000 - 33 330 000	3 328 - 8 320
1974-1975	4 248	3 189 101	751	12 756 000 - 31 890 000	3 003 - 7 507
1975-1976	4 406	3 338 196	758	13 352 000 - 33 380 000	3 030 - 7 576
1976-1977	4 609	4 075 532	884	16 304 000 - 40 760 000	3 537 - 8 864
1977-1978	4 919	5 134 062	1 044	20 536 248 - 51 340 620	4 175 - 10 395
1978-1979	5 109	6 081 434	1 190	24 325 736 - 60 814 340	4 761 - 11 903
1979-1980P	5 087	4 742 117	932	18 968 000 - 47 420 000	3 729 - 9 322

Table 37 (continued)

Fiscal Year	Total Injuries	Total Estimated Direct Costs in $	Per Injury Direct Cost in $	Estimated Range of Indirect Costs[1] in $	Range of Indirect Costs Per Injury ($)
			Federal Public Service Departments[3]		
1970-1971	19 197	6 094 047	317	24 376 000 - 60 940 000	1 270 - 3 174
1971-1972	20 175	6 620 648	328	26 484 000 - 66 210 000	1 313 - 3 282
1972-1973	22 119	7 863 138	355	31 452 000 - 78 630 000	1 422 - 3 555
1973-1974	22 797	8 745 385	384	34 981 540 - 87 450 000	1 534 - 3 836
1974-1975	22 775	9 598 189	421	38 392 000 - 95 980 000	1 686 - 4 214
1975-1976	23 158	10 423 896	450	41 696 000 - 104 240 000	1 801 - 4 501
1976-1977	25 228	12 201 151	484	48 804 000 - 122 010 000	1 935 - 4 836
1977-1978	28 800	18 769 779	652	75 079 116 - 187 697 790	2 607 - 6 517
1978-1979	26 115	17 829 552	683	71 318 208 - 178 295 520	2 731 - 6 827
1979-1980P	24 839	13 802 563	556	55 212 000 - 138 030 000	2 223 - 5 557

[1] Multipliers 4 to 10 were used for calculating the ranges.

[2] Not subject to Treasury Board Occupational Safety Policy but to Part IV, Canada Labour Code.

[3] Subject to Treasury Board Occupational Safety Policy.

P Preliminary

APPENDIX 1

Workers' Compensation Board Premium Rates
Over $10 Per $100 by Selected Industries
1981

Ontario	$
Cross-cutting, drifting or shaft-sinking, in or for mines, as business	18.00
Loading or unloading cars or other vehicles; stevedoring; wharves, operating of or work upon	14.55
Erection of prefabricated structural steel or concrete, steel bridges or prefabricated bridges, by the manufacturers, a general contractor or as a business	13.55
Business of supplying labour for wrecking of buildings by a general contractor or as a business	12.95
Manitoba	
Flying	10.00
Alberta	
Coal mining underground, sinking shafts in underground coal mines	12.00
Logging operation for building logs, plywood logs, saw logs, ties and lath bolts, and all work carried out in connection therewith including road making, swamping, skidding, trucking, loading, hauling, decking and all proper logging requirements	12.25
Operation of rotating-wing aircraft	10.00
British Columbia	
Logging, log salvage, tree spacing or tree thinning,	10.80
Log hauling, log booming or sorting	
Shingle or shake mills	10.05

Quebec

Extraction and crushing of quartz	12.40
Ore drilling	12.40
Drilling, sinking shafts, cross cutting, including related work	23.65
Prefabricated concrete production	13.61
Asbestos cement production	11.25
Production of asbestos thread, fibre, ceiling element, insulation joint, etc.	13.61
Construction of energy distribution systems	11.25
Construction of energy transportation systems; mircowave tower construction	16.19
Exterior panelling; sale and installation of doors, windows, and aluminium siding	10.15
Installation of lightning conductors, covering works, or other elevating works	10.15
Pile foundation	12.40
Demolition work	16.19
Insulation work	11.25
Drilling and dynamiting	12.40
Loading or unloading of strips	16.19
Trolley transport; transport of prefabricated houses or mobile homes	10.15
Transporting automobiles and vehicles	10.15

APPENDIX 2

ACCIDENT COSTS

A. Direct Costs

The words "Direct Costs" have been used to mean money paid out by provincial Workers' Compensation Boards in the settlement of compensation claims.

B. Indirect Costs

"Indirect Costs" include the losses suffered by the business concern apart from the compensation claims. These include the following items.

1. Cost of wages paid for working time lost by workers who were not injured.
2. The net cost to repair, replace, or straighten material or equipment that was damaged in an accident.
3. Cost of wages paid for working time lost by injured workers other than workmen's compensation payments.
4. Extra cost due to overtime work necessitated by an accident.
5. Cost of wages paid to supervisors during time required for activities necessitated by an accident.
6. Cost of wages due to decreased output of an injured worker after return to work.
7. Cost of the learning period of new worker.
8. Uninsured medical cost borne by the company.
9. Cost of time spent by higher supervisors and clerical workers on investigations or in the processing of compensation application forms.
10. Unusual miscellaneous costs.

APPENDIX 3

ACCIDENT PREVENTION EXPENDITURES

A. Design Costs

Whether plant machinery consists of a single item of machinery with guards, emergency stop buttons and the like, or a large interconnected system with elaborate control circuits, accident prevention costs will include the following items:

1. All equipment duplicated or triplicated in order to achieve control and/or shut-down capability over the plant at all times.

2. All barriers or control systems contained in the design that exclude the operator from the process or that contain the process separate from the operator or atmosphere.

3. That portion of the cost attributable to extra margins of thickness, strength, and so on, arising from design codes; e.g., Canada Building Safety Regulations.

4. Effluent dispersal or removal systems; ventilation systems.

5. Fire escapes, fireproof materials, barriers, and the like.

6. Factory construction costs attributable to safety regulations; e.g., escape routes.

B. Operation Costs

1. Cost of safety department:

   (a) Salaries, overhead
   (b) Publicity
   (c) Training
   (d) Protective clothing.

2. Cost of extra manpower hired specifically for safety reasons.

3. Cost of operating at stated levels for safety reasons; i.e., temperature, humidity, speed, etc.

4. Medical and first-aid station.

C. Planning and consequence-limiting costs.

1. Cost of insurance.

2. Cost of fire-brigades.

3. Cost of fault studies; i.e., safety assessment.

4. Cost of environmental sampling programs; i.e., biological controls.

5. Costs of testing for toxicity.

6. Costs of testing for electrical safety.

7. Costs of loading tests (structure).

8. Costs of testing for flammability.

9. Research and development costs.

APPENDIX 4

FEDERAL GOVERNMENT DEPARTMENTS

Agriculture
Auditor General of Canada
Canada Labour Relations Board
Canadian Government Printing Bureau
Canadian Grain Commission
Canadian Human Rights Commission
Canadian International Development Agency
Canadian Livestock Feed Board
Canadian Radio/TV and Telecommunications Commission
Canadian Transport Commission
Chief Electoral Officer
Commissioner of Official Languages
Communications
Consumer and Corporate Affairs
Correctional Service Canada
Employment and Immigration
Energy, Mines and Resources
Environment
External Affairs
Federal Court of Canada
Finance
Fisheries and Oceans
Foreign Investment Review Agency
Government House
Immigration Appeal Board
Indian Affairs and Northern Development
Industry, Trade and Commerce
Insurance
International Joint Commission
Justice
Labour
Law Reform Commission
National Capital Commission
National Defence
National Energy Board
National Health and Welfare
National Library
National Museums of Canada
National Revenue: -Customs and Excise
-Taxation
Parliament
Post Office
Privy Council Office
Public Archives
Public Service Commission
Public Works Canada
Regional Economic Expansion

Royal Canadian Mounted Police
Science and Technology
Secretary of State
Solicitor General
Statistics Canada
Supply and Service Canada
Supreme Court of Canada
Tariff Board
Tax Review Board
Transport: -Administration
-Air Services
-Marine Services
Treasury Board
Veterans Affairs

APPENDIX 5

FEDERAL CROWN CORPORATIONS AND AGENCIES

Atlantic Pilotage Authority
Atomic Energy Control Board
Atomic Energy of Canada
Bank of Canada
Canada Mortgage and Housing Corporation
Canadian Arsenals Limited
Canadian Broadcasting Corporation
Canadian Centre for Occupational Safety and Health
Canadian Council of Resource Ministers
Canadian Deposit Insurance Corporation
Canadian Film Development Corporation
Canadian Saltfish Corporation
Crown Assets Disposal Corporation
Defence Construction (1951) Limited
Economic Council of Canada
Eldorado Aviation Limited
Eldorado Nuclear Limited
Export Development Corporation
Farm Credit Corporation
Freshwater Fish Marketing Corporation
Great Lakes Pilotage Authority
International Development Research Centre
International N.W. Atlantic Fisheries Commission
International Pacific Halibut Fisheries Commission
International Pacific Salmon Fisheries Commission
Jacques Cartier and Champlain Bridge Incorporated
Laurentian Pilotage Authority
Medical Research Council
National Arts Centre Corporation
National Film Board
National Harbours Board
National Research Council
Natural Science and Engineering Research Council of Canada
Northern Canada Power Commission
Northern Pipeline Agency
Northern Transportation Company Limited
Pacific Pilotage Authority
Petro Canada
Public Service Staff Relations Board
Royal Canadian Mint
Science Council of Canada
Seaway International Bridge Corporation Limited
Seaway Transport Canada
Social Sciences and Humanities Research Council of Canada
Standards Council of Canada
Teleglobe Canada

APPENDIX 6

EMPLOYER'S ANNUAL ACCIDENT EXPERIENCE REPORT

(CANADA ACCIDENT INVESTIGATION AND REPORTING REGULATIONS)

RAPPORT ANNUEL DE L'EXPÉRIENCE D'ACCIDENTS DE L'EMPLOYEUR

(RÈGLEMENT DU CANADA SUR LES ENQUÊTES ET RAPPORTS D'ACCIDENTS)

YEAR/ANNÉE 19 ____

PLEASE SEE REVERSE SIDE FOR GUIDE TO COMPLETION/VOIR AU VERSO LE GUIDE À L'INTENTION DE CEUX QUI DOIVENT REMPLIR LA FORMULE

PLEASE NOTE COMPANY NAME AND/OR ADDRESS IF DIFFERENT FROM THAT SHOWN ON RIGHT.

ENTER COMPANY NAME & ADDRESS IF FORM HAS NO LABEL.

VEUILLEZ INDIQUER LE NOM ET(OU) L'ADRESSE DE LA COMPAGNIE S'ILS NE CORRESPONDENT PAS À CE QUI EST INDIQUÉ À DROITE.

VEUILLEZ INSCRIRE LE NOM ET L'ADRESSE DE LA COMPAGNIE SI LA FORMULE N'EST PAS ACCOMPAGNÉE D'UNE ÉTIQUETTE.

DEPARTMENTAL USE ONLY RÉSERVÉ AU MINISTÈRE ▼	GEOGRAPHIC LOCATION EMPLACEMENT GÉOGRAPHIQUE	NUMBER OF DISABLING INJURIES NOMBRE DE BLESSURES AYANT ENTRAINÉ UNE INVALIDITÉ	NO. OF FATALITIES Nº DE DÉCÈS	NUMBER OF MINOR INJURIES NOMBRE DE BLESSURES LÉGÈRES	TOTAL NUMBER OF EMPLOYEES NOMBRE TOTAL D'EMPLOYÉS	NUMBER OF OFFICE WORKERS NOMBRE D'EMPLOYÉS DE BUREAU	TOTAL NUMBER OF MAN-HOURS WORKED TOTAL DES HEURES TRAVAILLÉES
TOTAL ►							

Lab/Trav 393 (10/77) (APC-66)

Labour Canada / Travail Canada

SUBMITTING OFFICER'S NAME AND TITLE/NOM DE L'AUTEUR DU RAPPORT ET TITRE

SIGNATURE

NAME OF COMPANY/NOM DE LA COMPAGNIE

PHONE/TÉLÉPHONE

DATE OF SUBMISSION/ DATE DE PRÉSENTATION

APPENDIX 7

Labour Canada / Travail Canada

REPORT OF AN EMPLOYMENT INJURY **RAPPORT D'UNE BLESSURE AU TRAVAIL**

THIS INFORMATION MUST ALWAYS BE CODED — CES RENSEIGNEMENTS DOIVENT TOUJOURS ÊTRE CODÉS

1 2 3 8 9 11

TYPE	PROV.	FILE NUMBER	DEPT. OR AGENCY
TYPE	PROV.	NUMÉRO DE DOSSIER	MIN. OU ORGANISME

TYPE

1. DELETE — RAYER
2. NEW — NOUVEAU
3. CHANGE — CHANGER

12 13 14 15 16 20 21 26

CARD	AREA OFFICE	REG.	GEOGRAPHIC LOCATION	DATE CODED		
				D D	M M	Y Y
1						
CARTE	BUREAU RÉG.	RÉG.	SITUATION GÉOGRAPHIQUE	J J	M M	A A
				DATE CODÉE		

27 53

NAME OF CLAIMANT — NOM DU RÉCLAMANT

54 62 63 67 68 71 72 73 74

SOCIAL INSURANCE NUMBER	BUD GROUP	STATS CANADA OCCUP. CODE	AGE	SEX
NUMÉRO D'ASSURANCE SOCIALE	GROUPE IUN	STATS CANADA CODE PROFESS.	ÂGE	SEXE

12 13 18 19 21 22 24 25 28 29 31 32 33 36 37 39

CARD	DATE OF ACCIDENT	NATURE OF INJURY	PART OF BODY	SOURCE OF INJURY	TYPE OF ACCIDENT	EXT. OF DIS.	DAYS LOST	DAYS ON INJ. LEAVE
2								
CARTE	DATE DE L'ACCIDENT	NATURE DE LA BLESSURE	PARTIE DU CORPS	ORIGINE DE LA BLESSURE	GENRE D'ACCIDENT	DÉG. D'INV.	JOURS PERDUS	JOURS DE CONGÉ DE BLESSURE

40 45 46 47 50 51 55 56 61 62 66

WAGE RATE	PAY	DAYS CHARGED OR AWARDED	PERM. DISABILITY PERCENTAGE	CAPITALIZED VALUE	COMPENSATION COST
TAUX DE SALAIRE	PAYE	JOURS DÉBITÉS OU ALLOUÉS	POURCENTAGE D'INVALIDITÉ PERMANENTE	VALEUR CAPITALISÉE	FRAIS D'INDEMNISATION

67 71 72 73 74

MEDICAL AID COST	STAT	SPEC.	YR IND.
FRAIS D'AIDE MÉDICALE	STAT	SPÉC.	IND.

STATUS — STATUT

5. NO RETURN DATE — PAS DE DATE DE RETOUR
6. RETURN WITH NO COST — RETOUR SANS FRAIS
7. DISALLOWED — REFUSÉ
8. SETTLED — RÉGLÉ

CODER — CODEUR	DATE
CARD — CARTE 1	CARD — CARTE 2

DATA PROCESSING STAMP
ÉTAMPE DU TRAITEMENT DES DONNÉES

Lab/Trav 384 (04/81)

REFERENCES

Ashford, N.A.; Crisis in the Workplace, Cambridge, Mass., MIT Press, (1977).

Beckingsale, A.A.; "Finding the True Cost of Accidents", Proceedings of the National Industrial Safety Study Conference, 1966, 23-35.

BNA Special Report; OSHA and the Unions Bargaining on Job Safety and Health, Washington, D.C./The Bureau of National Affairs Inc., 1973.

Chadwick-Jones, J.K.; Absenteeism in the Canadian Context, Labour Data Branch, Labour Canada, 1980.

Crosby, J.R.; "The Economics of Safety", Pit and Quarry, February 1962, 102-104.

Economics Department, McGraw-Hill Publication Company; The Annual McGraw-Hill Survey of Investment in Employee Safety and Health, New York: McGraw-Hill, 1981.

Elson, M.W. and J.F. Burton Jr.; "Workers' Compensation Insurance Recent Trends in Employer Costs", Monthly Labour Review, Vol. 104, No. 3, 1981 45-50.

Follmann, J.F.; The Economics of Industrial Health, New York, American Management Association, 1978.

Foster, R.C. Jr.; "A Study of Some of the Costs and Benefits Related to Occupational Safety and Health in Selected Texas Industries", Ph.D. Dissertation, Texas A & M University, 1976.

Gouvernement du Québec; Occupational Health and Safety, 1977.

Heinrich, H.W.; Industrial Accident Prevention, New York, McGraw-Hill, 1959.

Holliday, R.; How Costly is Absenteeism? Mississauga, Industrial Health Assistance Ltd., 1977.

Kochan, T.A., Lee Dyer and D.B. Lipsky; The Effectiveness of Union-Management Safety and Health Committees, Kalamazoo, Mich., W.E. Upjohn Institute for Employment Research, 1977.

Labour Data Branch, Labour Canada; Strikes and Lockouts in Canada, 1979.

Labour Data Branch, Labour Canada; Provisions in Collective Agreements in Canada Covering 200 and More Employees, All Industries, 1981.

Manga, P., R. Brayles and G. Reschenthaler; "Occupational Health and Safety and Alternatives", Technical Report Series No. 6, Economic Council of Canada, 1981.

Mendeloff, J.; Regulating Safety, Cambridge, Mass., MIT Press, 1979.

Miller, James C. and Bruce Yandle; Benefit-Cost Analyses of Social Regulation, Washington, D.C., American Enterprise Institute for Public Policy Research, 1979.

Northrup, H.R., et al.; The Impact of OSHA, Labour Relations and Public Policy Series, No. 17, Philadelphia, University of Pennsylvania, Wharton School, Industrial Research Unit, 1978.

Occupational Safety and Health Branch, Labour Canada; Canadian Employment Injuries and Occupational Illnesses, 1979.

Rabinovitch, V.; "Crisis in the Workplace", Perception, Vol. 2, No. 4, 1979, 21-23.

Smart, C.N. and C.R. Sanders; The Cost of Spinal Cord Injuries - Status Report, Washington, D.C., Insurance Institute for Highway Safety, 1976.

Smith, Robert S.; The Occupational Safety and Health Act, Washington, D.C., American Enterprise Institute for Public Policy Research, (1976).

Wallach, M.B.; "Accident Costs - A New Concept", American Society of Safety Engineers Journal, 1977, 25-26.